

**FACT SHEET FOR NPDES PERMIT
NO. WA-002402-3**

**CITY OF YAKIMA
PUBLICLY-OWNED TREATMENT WORKS**

SUMMARY

The City of Yakima is seeking reissuance of its National Pollutant Discharge Elimination System (NPDES) for its Regional Publicly-Owned Treatment Works (POTW). The Regional POTW serves the City of Yakima, the City of Union Gap, the Terrace Heights Sewer District (which lies east of Yakima), and additional customers within the urban growth management area. The Regional POTW provides wastewater collection and treatment to approximately 93,000 people within the service area.

During the term of the previous permit, 1997 to 2002, the City has remained in compliance with the conditions and responsibilities in the permit. A significant operational change undertaken in 2001 by the City was to treat process wastewater from Del Monte Corporation, a significant industrial user, using the activated sludge process in the main treatment plant rather than on the previously utilized Industrial Waste Sprayfield. At present, the City is upgrading some treatment plant processes to better accommodate the additional waste loadings. The City has continued its aggressive program to rehabilitate and maintain its extensive and aging collection system.

The previous permit authorized the City to develop and implement a partially delegated pretreatment program. In June 2000 the City submitted to the Department an application for full pretreatment authority, and is prepared to implement its pretreatment program after approval of the application and issuance of this permit.

This permit contains interim and final effluent limits. Interim limits are concentration-based only; mass loading limits were not established because of uncertainty concerning the treatment plant's design flows. The City submitted a draft *Facility Plan* in October 2000, but the design flows and loadings were ambiguous, and the City has not yet submitted a final *Facility Plan*. Final effluent limits for ammonia, fecal coliform bacteria and oxygen demand will be established based on findings of the water quality evaluation in the approved *Facility Plan*, which is required to be submitted to the Department by October 15, 2003. In addition, this permit requires routine monitoring of the treatment plant influent and effluent, WET compliance testing, and a receiving water and effluent study to evaluate the discharge for compliance with the State's Surface Water Quality Standards for metals.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Yakima
Facility Name and Address	City of Yakima Regional Publicly-Owned Treatment Works 2220 E. Viola Avenue Yakima, WA 98901
Treatment Processes:	Activated sludge with primary and secondary clarifiers, trickling filters, and chlorine disinfection with dechlorination.
Discharge Location	Yakima River, River Mile 110.1 Latitude: 46° 34' 48" N Longitude: 120° 27' 52" W
Water Body ID Number	WA-37-1040

BACKGROUND INFORMATION

The City of Yakima (City) is located in south-central portion of the State, and is the largest city and the commercial center of Yakima County. The City is bordered by the Naches River to the north, the Yakima River to the east, the Town of Union Gap to the south, and unincorporated West Valley to the west. The treatment plant and deactivated sprayfield are located in southeast Yakima, to the west of the Yakima River.

DESCRIPTION OF THE FACILITY

The City of Yakima Regional POTW consists of the main treatment plant, the recently deactivated sprayfield and an extensive collection system. In addition to serving the residential, commercial and industrial dischargers located within City limits, the facility also provides service to the Town of Union Gap and unincorporated areas of the county to the east and west of the City. The draft 2000 *Facility Plan* indicates the current base service area population at approximately 93,000 people (Table 4-1).

The City of Union Gap has a right to 8.1 percent of the current POTW treatment capacity, and the Terrace Heights Sewer District has a right to 4.0 percent of the current treatment capacity. The City of Yakima retains the remaining 87.9 percent of the treatment capacity which provides for the service requirements of the City and unincorporated areas within the City's retail service area.

Main Treatment Plant

The City's Publicly-Owned Treatment Plant (POTW) was originally constructed in 1936 as a primary treatment facility. Improved control of water pollution was accomplished by the separation of industrial and domestic sewage in 1955 and the associated construction of an industrial waste sprayfield. The POTW was upgraded in 1965 by the addition of trickling filter biological treatment.

In 1982-1983, the City put into service four concrete activated sludge aeration basins and two secondary clarifiers in order to meet the requirements of secondary wastewater treatment. In 1987-1988, the POTW improved the oxygen transfer in the aeration basins by the installation of a fine-bubble air diffusion system.

During the period from 1991 to 1996 many major POTW upgrades were made, including:

- (1) Modification of existing outfall;
- (2) Construction of an oil/water separator on one of the influent side streams;
- (3) Modification of the headworks to include two new barscreens, and 2 solids screening compactors;
- (4) Replacement of the entire grit removal system;
- (5) Construction of a new trickling filter pump station;
- (6) Construction of an intermediate degritter for removing snails from trickling filter effluent prior to discharge to activated sludge aeration basins;
- (7) Addition of domes to trickling filters with an integrated odor control system;
- (8) Construction of a dechlorination facility;
- (9) Addition of a second centrifuge for increased biosolids handling;
- (10) Modifications to the biosolids drying beds;
- (11) Paving and improvements of the biosolids storage area;
- (12) Expansion of laboratory for monitoring non-conventional pollutants;
- (13) Secondary clarifier flocculation wells and baffles;
- (14) Digester mixing;
- (15) Digester gas storage;
- (16) Improved C-2 water pumping system;
- (17) Super-chlorination of C-2 water for meeting water reuse standards; and
- (18) SCADA improvements.

During the 1990s, the City made significant changes in its management and operation of the POTW, as well as its relationship to the system's non-domestic dischargers. Improvements included:

- (1) Certification of the onsite laboratory for the atomic absorption and gas chromatograph analytical procedures;
- (2) Significant expansion of its Partial Pretreatment Program, including:
 - a. Extensive monitoring of non-domestic discharges;
 - b. Addition of more program-dedicated personnel; and
 - c. Submission of various components pertaining to the ultimate delegation of a Partial Pretreatment Program from the Department;

- (3) Updating the Industrial User Survey (IUS);
- (4) Increasing personnel to allow for better overall facility operation and management; and
- (5) The purchase and use of various equipment for the inspection and maintenance of the collection systems.

At present, the wastewater treatment processes utilized by the City consist of a headworks with barscreens, screenings compactor, grit removal; Parshall flume; primary clarification; trickling filters; trickling filter clarification; diffused aeration activated sludge; secondary clarification; anaerobic digestion; centrifugal biosolids dewatering; centrate lagoons; chlorination disinfection; dechlorination; an outfall and process control buildings.

The Yakima treatment plant is categorized by the Department as a Class IV facility, based on its design flow of more than 10 million gallons per day (MGD) and its primary treatment type, in accordance with WAC 173-230-140.

The principal treatment plant operator of this system must be a Class IV wastewater treatment facility operator certified by the State of Washington.

Sprayfield

The City's recently deactivated industrial waste sprayfield is located on approximately 100 acres between Interstate 82 and the Yakima River, and immediately to the east and south of the main treatment plant. The industrial collection system and sprayfield were constructed in 1958 due to the overloading of the City POTW by the nine original industrial wastewater dischargers (fruit and vegetable processors). The last remaining discharger to the City's industrial waste system was Del Monte Corp Plant #125, a large-volume fruit processor. The industrial waste sprayfield was typically used from June through November, with a small amount of industrial wastewater being treated by the main treatment facility during the rest of the year.

In a letter dated April 18, 2001, the City notified the Department that process wastewater from Del Monte, which would normally be land applied to the sprayfield, would be treated at the main treatment plant. The City wanted to determine the treatability of Del Monte's wastewater by the activated sludge process in the main treatment plant. The experiment was successful and, at this time, the City has no plans to reactivate the sprayfield. This permit does not authorize any further wastewater discharges to the sprayfield.

Collection Systems

The City has two separate collection systems that convey wastewater to the POTW: a sanitary and an industrial waste system. The industrial wastewater collection system conveys process wastewater from the Del Monte processing plant to the POTW.

The original sanitary wastewater collection system consisted of open ditches which discharged untreated effluent directly into the Yakima River. Construction of the system began in 1890 and was

completed in 1912. The collection system was significantly expanded between 1922 and 1926. The present sanitary collection system consists of more than 290 miles of vitrified clay, concrete, asbestos-concrete and PVC pipe which presently serves approximately 93,000 persons. The collection system piping incorporates diameters from 6 inches through 48 inches and conveys wastewater to the POTW from the City of Yakima, the City of Union Gap, the Terrace Heights Sewer District and unincorporated portions of Yakima County.

By the early 1990s there were significant inflow and infiltration (I&I) problems with the collection system due to old leaky sewers, root intrusion, unlined irrigation canals, leaky irrigation water distribution lines, stormwater and non-contact cooling water connections. Since 1990, the City has been aggressively rehabilitating deficient portions of the collection system. Through the end of 1994, the City was able to reduce the quantity of I&I by over 2.25 MGD. The City will continue its efforts to reduce I&I in the future, as recommended in the Comprehensive Plan, and has recently grouted over 15 miles of sewer.

Discharge Outfall

Secondary treated and disinfected effluent is discharged to the Yakima River at River Mile 110.1 via two 24-inch diameter steel pipes, each terminated by a 10-inch x 34-inch rectangular diffuser port. The POTW outfall is located approximately 30 feet offshore at a depth of 10 feet (6.1 feet at 7Q10).

Residual Solids

The treatment facilities remove solids at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained, compacted and disposed of as solid waste at the local landfill. Solids removed from the clarifiers are treated anaerobically, dewatered and land applied under a permit from the Yakima Health District.

PERMIT STATUS

The previous permit for this facility was issued on September 8, 1997. The previous permit placed effluent limitations on the discharge to the Yakima River on the following parameters: 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform Bacteria, Total Residual Chlorine and Total Ammonia.

The previous permit placed an *interim* hydraulic loading (Flow) limitation on the discharge to the Industrial Sprayfield. The permit also required the City to propose *final* organic loading limits for the sprayfield in a Sprayfield Engineering Report (Special Condition S11.) by July 1, 2001. The parameters to be addressed were: Flow, 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Total Coliform Bacteria, Total Kjeldahl Nitrogen (TKN). However, the City ceased using the sprayfield in October 2000. Therefore, in order to fulfill the permit requirement to develop final loading limits, the City submitted final sprayfield loading limits as Appendix A to the O&M Manual. (Appendix A is a 2-page document titled the *City of Yakima Industrial Waste Sprayfield Guidelines for Operation of the Land Application System*, dated July 17,

2000.) Monthly limits were proposed for Flow, BOD, Nitrogen and Potassium. The Department approved the updated O&M Manual in a letter dated January 30, 2001.

An application for permit renewal was received by the Department on December 14, 2001 and accepted by the Department on January 2, 2002.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

A compliance inspection without sampling was conducted on January 28, 2002. The Department's inspectors found a well-run and well-maintained facility. At that time, treatment plant staff were preparing to bring online a rehabilitated clarifier that is expected to improve the quality of effluent from the trickling filter.

During the history of the previous permit, the Permittee has remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

Administrative Order No. DE 99WQ-C183, dated August 24, 1999, was issued by the Department to the City postponing the submittal date for the Sprayfield Engineering Report (ER) required by the previous permit. The City requested the extension to allow its consultant to utilize additional data that would result in a more comprehensive ER. The City's request was granted and the ER was received by the Department on December 28, 1999.

Administrative Order No. DE 99WQ-C137, dated June 4, 1999, was issued by the Department to the City modifying the schedule for Whole Effluent Toxicity (WET) Testing established in the previous permit. The order was issued in response to the City's request to modify the schedule to more effectively determine the presence of toxicity in the discharge. Specifically, the City suspected that toxicity present in previous tests was linked to fruit processors discharging to the POTW. The testing schedule was modified to increase sampling during the fruit processing season, from August to December, and decrease sampling during the other seasons.

The previous permit required numerous submittals. Some of the reports are routine for any major municipal discharger, such as DMRs and WET Testing, and others were required in preparation for the delegation of pretreatment authority specified in this permit. Table 1 lists, in columns from left to right, the permit condition in which the submittal was required, the title of the report, the due date and the status of the submittal.

Table 1: Status of Submittals Required by the Previous Permit

Permit Section	Submittal	First Submittal Date	Status
S3.A.	Discharge Monitoring Report	November 15, 1997	Received as required
S4.D.	Infiltration and Inflow Evaluation Report	January 1, 1998	Received as required
S5.B.	Updated Operation and Maintenance Manual	January 1, 2001	Received December 29, 2000
S8.F.	Application for Complete Pretreatment Program Delegation	July 1, 2000	Received June 30, 2000
S8.F.1.	Sewer Use Ordinance	July 1, 2000	Received June 9, 2000
S8.F.2.	Determination of Adequacy	July 1, 2000	Received June 30, 2000
S8.F.3.	Local Limits Report	July 1, 2000	Received June 30, 2000
S8.E.4.	Industrial User Survey	July 1, 2000	Received June 30, 2000
S8.G.	Annual Pretreatment Program Report	April 1, 1998	Received as required
S9.A.2.	Acute WET Compliance Monitoring Data Report	a	Received as required
S9.A.2.	Acute WET Compliance Monitoring Summary Report	b	Received July 2, 2002
S10.A.2.	Chronic WET Compliance Monitoring Data Report	a	Received as required
S10.A.2.	Chronic WET Compliance Monitoring Summary Report	b	Received July 2, 2002
S11.A.	Sprayfield Engineering Report	July 1, 1999	December 28, 1999
S12.C.	Additional Chemical Analysis of Effluent and Receiving Water Sampling and Quality Assurance Plan	January 1, 1998	Received July 21, 1999
S12.C.	First Year Effluent Sampling Report	April 1, 1999	Received June 30, 1999
S12.C.	Second Year Effluent and Receiving Water Sampling Report	April 1, 2000	Received June 30, 1999
G17.	Application for Permit Renewal	December 1, 2001	Received October 22, 2001
a-Specific submittal dates for the Acute and Chronic WET Compliance Monitoring Data Reports were not established by the previous permit; rather, these reports were required to be received by the Department 30 days after each sampling event.			
b-Specific submittal dates for the Acute and Chronic WET Compliance Summary Reports were not established by the previous permit; rather, these reports were required to be received by the Department 60 days following the last acute WET compliance monitoring sampling event, and prior to the expiration date of this permit.			

WASTEWATER CHARACTERIZATION

Influent

Domestic

Conventional Pollutants

Monthly influent characterization data are presented Table 2 in comparison to design loadings. Data reflect influent loadings reported in DMRs submitted during calendar years 2000 and 2001. Use of the industrial sprayfield ceased on October 3, 2000, and wastewater from Del Monte was treated by the trickling filter and activated sludge processes for the remainder of the season. During 2001 Del Monte sent all its process wastewaters to the treatment plant and the data reflect these loadings.

Table 2: Characterization of Conventional Pollutant Influent Loadings

Parameter	2001		Monthly Design Loading ^a
	Annual Average	Highest Monthly Loading	
Flow, in MGD	11.92	16.16	22.3
BOD ₅ , in lbs/day	31,691	42,231	32,700
TSS, in lbs/day	21,588	28,542	35,000

^a-There is some uncertainty concerning the validity of this design criteria; see the DESIGN CRITERIA section of this fact sheet for further discussion of this issue.

Total BOD loadings to the treatment plant exceeded maximum monthly design loadings during August, September, October and November of 2001. Excluding the Del Monte loadings, the treatment plant would *not* have exceeded its BOD design criteria during 2001.

In addition to the BOD exceedances of design criteria resulting from the Del Monte discharges, BOD loadings to the treatment plant exceeded the 85% planning threshold during January, March and April 2001, when Del Monte was *not* discharging to the City. The City's upcoming final *Facility Plan* is required to address treatment capacity of the plant.

Priority Pollutants

From August through December 2000 the City took a series of 20 influent samples and analyzed them for a suite of metals. These data are summarized in Table 3. All parameters had at least some non-detects, so averages were not calculated. The previous permit did not require testing of the influent for additional priority pollutants; however, the City submitted 3 influent pesticide

characterizations. Sampling for pesticides in the influent occurred in June, August and September 1999. Only the September sample revealed the presence of pesticides and those were at levels only slightly higher than the quantitation level.

Table 3: Influent Characterization

Priority Pollutant Parameter	Units	Maximum Value	Number of Detects
Antimony	µg/L	<40 ^a	0
Arsenic	µg/L	21.3	2
Beryllium	µg/L	<0.1	0
Cadmium	µg/L	2.68	13
Chromium	µg/L	4.68	14
Copper	µg/L	355	13
Lead	µg/L	12.6	10
Mercury	µg/L	<0.2	0
Molybdenum	µg/L	13.5	5
Nickel	µg/L	4.84	9
Selenium	µg/L	15.4	2
Silver	µg/L	11.3	18
Thallium	µg/L	<40	0
Zinc	µg/L	159	16
Beta BHC	µg/L	0.145	1
Beta Endosulfan	µg/L	0.129	1
Heptachlor	µg/L	0.064	1
Heptachlor Epoxide	µg/L	0.081	1

a-< means that the metal was not found to be present down to the indicated quantitation level.

The September 18th sample indicated a copper concentration of 355 µg/L. This result appears to be an anomaly, since the next highest concentration was 46 µg/L, and the higher value may have been due to a laboratory error. Overall, the results are typical of treatment plant influent with a customer profile similar to Yakima's.

Del Monte Wastewater

Del Monte Plant #125 is one of the largest industrial dischargers to the City's treatment plant. Del Monte's main processing season typically occurs from August through November, when pears are processed. During the 2001 processing season, Del Monte's monthly average BOD discharge ranged from 11,080 lbs/day to 12,763 lbs/day, approximately one-third of total BOD loadings to the treatment plant. Hydraulic (flow) and suspended solids loadings were relatively minor. In addition, Del Monte typically processes cherries for 2-3 weeks during the summer, but loadings to the treatment plant are minor.

Effluent

The concentration of pollutants in the discharge was reported in the NPDES application and DMRs submitted to the Department. In the case of pollutants limited in the previous permit, the characterization is given in the context of the permit limit.

Conventional Pollutants

BOD and TSS

Average monthly BOD and TSS effluent concentrations are characterized for 2001 in Table 4. Effluent characteristics for 2001 are profiled because this was first year the City treated all of Del Monte's wastewater in the main treatment plant.

Table 4: Characterization of Effluent BOD and TSS

Parameter	2001		Monthly Permit Limits
	Annual Average	Highest Monthly Average	
BOD ₅ , in mg/L	10.25	20	30
TSS, in mg/L	8.25	18	30

During 2001, the highest monthly averages for BOD and TSS occurred in March, *not* during pear processing season. The lowest percent removal rate for these 2 parameters during the 2001 processing season was 96.8%, and the TSS removal rate actually increased during the 2001 processing season. These data suggest that with the additional process unit in operation process wastewater discharges from Del Monte has little, if any, discernable impact on treatment efficiency of the treatment plant.

Fecal Coliform

Table 5 contains a summary of fecal coliform bacteria for 2000.

Table 5: Characterization of Effluent Fecal Coliform Bacteria

Parameter	Annual Average	Highest Reported Average Monthly	Average Monthly Permit Limit	Highest Reported Average Weekly	Average Weekly Permit Limit
Fecal Coliform Bacteria, in # colonies/100 mL	16	70	200	100	400

The highest fecal concentrations occurred during October and are not representative of the year's discharges. The second highest monthly average reported for the year was 19 colonies/100 mL and

the second highest weekly average reported for the year was 44 colonies/100 mL, well below the permit limits.

pH

During 2000, the lowest reported pH was 5.5 and the highest reported pH was 7.2. The reported value of 5.5 was an exceedance of the permit limit, but because it was the only pH violation of the year, the Department took no enforcement action. City staff believe the test result of 5.5 was anomalous.

Ammonia and Residual Chlorine

In the previous permit, average monthly and maximum daily effluent limits for ammonia and residual chlorine were established. Table 6 presents an effluent characterization of these pollutants, based on calendar year 2000 data, and their respective permit limits.

Table 6: Ammonia and Residual Chlorine Effluent Characterization

Parameter	Units	Highest Reported Average Monthly	Average Monthly Permit Limit	Highest Reported Maximum Daily	Maximum Daily Permit Limit
Ammonia	mg/L	1.99	4.16	8.15	12.3
Total Residual Chlorine	mg/L	<0.006	0.012	<0.006	0.029

The City dechlorinates its discharge to minimize chlorine residual. The method detection level analytical method utilized by the treatment plant laboratory is 0.006 mg/L.

Priority Pollutants

A characterization of priority pollutants was reported in the City's most recent NPDES application. All metals results are reported as total recoverable and are reported in Table 7. Other toxic organic compounds are reported in the table when they were present at concentrations higher than the quantitation level (QL).

The City submitted results of 5 effluent pesticide characterizations. Sampling occurred in June, August, September, October and November 1999. The 2 pesticides found to be present in the effluent were present only once, in the September sample.

Table 7: Effluent Characterization

Parameter	Units	Maximum Value	Average Value	QL	Number of Samples
Arsenic	µg/L	1.85	1.268	1	9
Cadmium	µg/L	0.294	0.167	0.1	9
Chromium	µg/L	1.849	1.187	1	9
Copper	µg/L	12.06	7.829	1	9
Lead	µg/L	3.278	1.341	1	9
Mercury	µg/L	0.026	0.016	0.001	9
Nickel	µg/L	2.429	1.773	1	9
Silver	µg/L	1.068	0.682	0.2	9
Thallium	µg/L	0.095	0.039	0.005	9
Zinc	µg/L	101.80	57.86	4	9
Cyanide	µg/L	10.2	^a	0.01	9
Total Phenolic Compounds	mg/L	ND	ND	0.05	9
Hardness, as CaCO ₃	mg/L	52.1	40.5	5	10
Bis-(2-ethylhexyl) phthalate	µg/L	6.5	2.43	0.87	10
Butylbenzylphthalate	µg/L	0.17	0.135	0.071	10
Chloroform	µg/L	3.6	2.16	0.049	10
Di-N-Butylphthalate	µg/L	10	1.70	0.15	10
Di-N-Octylphthalate	µg/L	1.3	0.82	0.094	10
1,3-Dichlorobenzene	µg/L	6.28	3.35	0.56	10
1,4-Dichlorobenzene	µg/L	1	0.437	0.13	10
Dichlorobromomethane	µg/L	0.97	0.377	0.026	10
Diethyl phthalate	µg/L	3.3	1.78	0.14	10
2,4-Dinitrotoluene	µg/L	0.78	0.78	0.097	10
Methylene chloride	µg/L	2.2	0.673	0.13	10
Naphthalene	µg/L	1.3	1.3	0.47	10
N-nitrosodiphenylamine	µg/L	0.28	0.195	0.054	10
Phenol	µg/L	15	6.15	0.065	10
Tetrachloroethylene	µg/L	0.63	0.272	0.037	10
Toluene	µg/L	1.29	0.928	0.047	10
Trichloroethylene	µg/L	0.18	0.18	0.033	10
Beta BHC	µg/L	0.124	NA	0.05	5
Beta Endosulfan	µg/L	0.163	NA	0.1	5

ND-Not detected

NA-Not applicable

a-Calculation of an average value was not possible given the number of non-detects.

SEPA COMPLIANCE

The City has prepared a State Environmental Policy Act (SEPA) checklist and a State Environmental Review Plan (SERP) checklist to assess potential impacts of the treatment plant upgrade to the environment. These checklists were prepared to fulfill State and Federal environmental planning requirements of SEPA and the National Environmental Policy Act (NEPA), respectively. The SERP review incorporates the SEPA review by reference. The two reviews are required to be completed as part of the final *Facility Plan*. The City has partially fulfilled the requirements of SEPA and SERP, but the permit requires the City to provide some documentation in support of the findings.

PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants. Because the City of Yakima is undergoing plant improvements and is developing a *Final Facility Plan*, some final effluent limits are listed as To Be Determined ("TBD"). The Department will incorporate the final limits into the City's permit consistent with the modification and public notice requirements of WAC 173-220-190.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for the existing treatment facility that appeared in the previous permit were as follows:

Table 8: Design Criteria for Existing City of Yakima Regional WWTP

Parameter	Design Quantity
Monthly average flow (max. month)	22.3 MGD
BOD ₅ influent loading (max. month)	32,700 lbs/day
TSS influent loading (max. month)	35,000 lbs/day
Design population equivalent	61,000 persons

However, the basis of these criteria are not clear. The fact sheet associated with the previous permit cited earlier permits as the basis of the above design criteria. The most recent Department-approved *Facility Plan*, dated June 1989, lists 3 separate sets of design criteria with widely varying values (Table 3-3). The *Draft City of Yakima Wastewater Facilities Plan*, dated October 2000 and not yet approved by the Department, lists the following design criteria:

Table 9: Draft Design Criteria for Existing City of Yakima Regional WWTP

Parameter	Design Quantity
Monthly average flow (max. month)	15.3 MGD
BOD ₅ influent loading (max. month)	23,200 lbs/day
TSS influent loading (max. month)	20,100 lbs/day

The criteria in Table 9 appear in Figure 5-3 of the 2000 document and are labeled as reflecting treatment capacities of the existing treatment plant. Further on in Section 5, Table 5-6 summarizes the treatment capacities of the separate processes of the facility and quantifies the maximum monthly hydraulic capacity of the aeration basins at 12.1 MGD. Interestingly, the 'Firm Capacity Maximum Month' column heading has a footnote which states that the 'Current Maximum Month' capacity (for the plant as a whole) is 14.38 MGD. Given the inconsistencies in the abovementioned documents and the City's present efforts at developing a new *Facility Plan*, this permit contains 'To Be Determined' design criteria, which will be established when the upcoming *Facility Plan* is approved by the Department.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

Concentration-Based Effluent Limits

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS are taken from Chapter 173-221 WAC are:

Table 10: Technology-based Limits

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 ML
BOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

Mass-loading Effluent Limits

This permit does not establish mass loadings effluent limits because of uncertainty of the design criteria, especially flow. BOD and TSS mass loadings effluent limits can be determined in two ways: 1) utilizing the organic design loading and the removal rate, or, 2) multiplying the secondary treatment standard monthly limit (30 mg/L) by the design flow by a conversion factor (8.34). The previous permit contained mass loading effluent limits, utilizing the first method, based on 85% removal of the organic design loadings. However, as was discussed in the previous section of this fact sheet (see DESIGN CRITERIA), the permit writer was not able to determine the present design loadings. Similarly, the second method was not utilized because rated hydraulic capacities of the treatment plant range from 12.1 MGD (in the draft 2000 *Facilities Plan*) to 22.3 MGD (in the previous permit). Given the uncertainty of the design criteria of the existing treatment plant, the City's current plans to upgrade the facility, and the fact that mass loading limits are another expression of the concentration-based limits, it is the best professional judgment of the permit writer that the concentration-based limits will be sufficiently protective of the environment. The Permittee is required to continue reporting actual effluent loadings to the river in its monthly DMRs.

BOD and Oxygen Demand

The impact of oxygen demand in the City's discharge to dissolved oxygen levels in the river was modeled and found to violate the water quality standards. The discharge was modeled using the

Streeter-Phelps methodology on the Department's standard spreadsheet developed for this purpose, DOSAG2.XLS. Analyses were conducted the 95th percentile effluent BOD value of 20 mg/L. The receiving water dissolved oxygen concentration of 9.2 mg/L was reduced to 7.98 mg/L as a result of the discharge. Although the resulting dissolved oxygen level is only slightly lower than the Class A water quality criterion of 8 mg/L, the State's Antidegradation policy states: Whenever waters are of a higher quality than the criteria assigned for said waters, the existing water quality shall be protected and pollution of said waters which will reduce the existing quality shall not be allowed . . . (WAC 173-201A-070(4)). The Antidegradation policy is a narrative expression of the State's Surface Water Quality Standards. Further discussion of the Streeter-Phelps analysis may be found in the section of this fact sheet titled Consideration of Surface Water Quality-Based Limits for Numeric Criteria.

The regulations clearly state that when technology-based effluent limits are not protective of water quality, water quality-based limits must be established (WAC 173-201A-130(b)(i)). However, this permit does not establish numerical water quality-based effluent limits because the treatment plant is undergoing an upgrade at this time. Therefore, Special Condition S11.A1 of this permit requires the City to conduct a thorough analysis of the impacts of the discharge to the receiving water.

During the first portion of the permit cycle technology-based effluent limits will be in effect. Final limits will be determined in the final *Facility Plan* the City is developing and, after the plan is reviewed and approved by the Department the final limits will be incorporated into the permit through an Administrative Order or permit modification.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards.

The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

All spreadsheets used by the permit writer to develop the conditions of this permit may be found in Appendix C of this fact sheet. Generally, they are arranged in the order in which they are discussed in this fact sheet.

Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface

water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

At this time (June 2002), the Department is revising the aquatic criteria for the following parameters: temperature, dissolved oxygen, bacteria, and ammonia. Revisions to the criteria are intended to better protect aquatic life, especially endangered species. The Department is currently holding workshops for the public to explain changes to the existing criteria; formal public review of the new rule is expected to begin soon. Since the City's discharge contains all these constituents, compliance with the revised criteria will be addressed in future permits.

Numerical Criteria for the Protection of Human Health

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish consumption and drinking water from surface waters.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

Antidegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

Critical Conditions

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

Mixing Zones

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic

environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

1993 Effluent Mixing Zone Study

In 1993, the City conducted an effluent mixing study to assess performance of the newly-upgraded outfall. The study was conducted by HDR Engineering, Inc., using fluorometric dye and the UM portion of the PLUMES surface water model. The dye study was conducted on January 13, 1993 when river flow was determined to be 860 cfs as measured at the Bureau of Reclamation gage at the Terrace Heights Bridge. Transects were established at 30 feet and 300 feet downstream of the outfall, corresponding to the edges of the acute and chronic mixing zones, respectively. On that day, effluent flows ranged from 9.40 MGD to 10.72 MGD. The dye study determined an acute dilution factor of 5 and a chronic factor of 14 (p. VI-2).

The computer modeling portion of the study assumed a critical condition flow of 1,000 cfs and an effluent flow of 10 MGD. The calculated dilution factors were 4 (acute) and 10 (chronic) (p. VII-1).

Unfortunately, this study was flawed and is now outdated. The study was flawed because 7Q10 flows were assumed to be 1,000 cfs, while the critical condition flow was calculated by the Department to be 632 cfs. The study is now outdated because treatment plant effluent flows have significantly increased since the time of the study. Flows relevant to determination of dilution factors now exceed 15 MGD, as will be discussed in the following section of this fact sheet.

Calculation of Dilution Factors for the Previous Permit

In support of the previous permit, the Department's Environmental Investigations and Laboratory Services Program (now the Environmental Assessment program) determined the 7Q10 (lowest seven-day average river flow with a recurrence interval of ten years) of the Yakima River (USGS 12500405) to be 632 cfs based on flow monitoring data for the period of record 1968 to 1995. Use of this value appears appropriate because, in response to comments to the previous permit, the permit writer stated that flows of 632 cfs or lower occurred in 1988 and 1993 (p. 55).

The Department used this last calculated 7Q10 value, in conjunction with subsequent velocity data provided in a May 27, 1997 letter from HDR Engineering, Inc., to determine the acute and chronic mixing zone dilution factors to be 1.51 and 6.61, respectively. In accordance with WAC 173-201A-100, the acute dilution factor was calculated utilizing 2.5% of the 7Q10 flow of the Yakima River, and the chronic dilution factor was calculated utilizing 25% of the 7Q10 flow of the Yakima River. The fact sheet associated with the previous permit stated that the RIVPLUME5 model was used to calculate these dilution factors. Table 11 was reproduced from the fact sheet associated with the previous permit. It contains the data used in the determination of dilution factors established in the previous permit.

Table 11: Data Used to Determine Dilution Factors for the Previous Permit

Parameter	Acute Aquatic Life-based Limits	Chronic Aquatic Life-based Limits	Human Health Carcinogenic Limits	Human Health Non- Carcinogenic Limits
POTW Effluent Flows	Highest Actual Daily Maximum Flow During the Past 3 Years = 30.775 cfs	Highest Actual Monthly Average Flow During the Past 3 Years = 28.145 cfs	Average Annual Design Flow = 21.198 cfs	Highest Actual Monthly Average Flow During the Past 3 Years = 28.145 cfs
Yakima River Flows	7Q10 Flow and Velocity = 632 cfs and 3.07 fps	7Q10 Flow and Velocity = 632 cfs and 3.07 fps	Harmonic Mean Flow and Velocity = 2320 cfs and 4.05 fps	30Q5 Flow and Velocity = 920 cfs and 3.60 fps
Calculated Dilution Factors	1.51	6.61	10.27	7.33

The spreadsheet used to calculate dilution factors in the previous permit was not preserved. When the effluent and receiving water flows were inserted into RIVPLUME5 to confirm the dilution factors for this permit, the resulting dilution factors were 13.97 (acute) and 43.25 (chronic). However, utilization of a simple mass-balance calculation resulted in the more conservative dilution factors presented in Table 11.

Dilution Factors in this Permit

Dilution factors were not recalculated for this permit, but were retained from the previous permit for reasons of continuity. During the previous permit cycle, the Permittee conducted extensive testing of priority pollutants in the effluent and receiving water, then carried out an elaborate analysis of whether the discharge is in compliance with the State's Surface Water Quality Standards. The analysis is contained in *Additional Chemical Analysis of Effluent and Receiving Water--Second Report*, dated June 30, 2000. The analysis was based on the 7Q10 value of 632 cfs, as specified in the previous permit. Because the treatment plant is undergoing an upgrade, this permit contains interim effluent limits based on the secondary treatment standards. This permit requires the City to conduct a comprehensive water quality evaluation as part of the final *Facility Plan* to allow the City time to determine whether the discharge is in compliance with the water quality standards. As part of the water quality evaluation, the City has the opportunity to re-analyze its previous dilution study and submit the new findings to the Department for review and approval. Therefore, the dilution factors in this permit remain at 1.51 (acute) and 6.61 (chronic).

Description of the Receiving Water

The facility discharges to the Yakima River, which is designated as a Class A receiving water in the vicinity of the outfall. Other nearby point source outfalls include Snokist, a fruit processor, approximately 1 mile upstream. Significant nearby non-point sources of pollutants include discharge points for urban stormwater and runoff from agricultural lands. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

The Department's 303(d) list is a compilation of all water bodies in the State with documented exceedances of the water quality standards. The most current compilation, the 1998 303(d) list, designates the segment of the Yakima River to which the facility discharges, WA-37-1040, as water quality-impaired for the following pollutants: fecal coliform bacteria, mercury, and silver.

The fact sheet associated with the previous permit stated that this segment of the river was also listed for DDT, 4,4-DDE, Dieldrin and pH. However, further research revealed that although water quality-impaired status was proposed for these pollutants, they were not included on either the final 1996 or 1998 lists because violations of the water quality criteria were documented only once per parameter during the 1980's. Similarly, the present listings for mercury and silver are based on excursions documented in the late-1980's, and confirmation monitoring will occur before TMDLs are scheduled.

Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Surface water quality criteria for priority pollutants are provided in the Toxic Pollutants subsection of this fact sheet. Criteria for conventional pollutants present in this discharge are summarized below:

Table 12: Class A Water Quality Criteria

Parameter	Criterion
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	21 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background

Class A surface waters normally have a temperature criteria of 18° C. However, WAC 173-201A-130(141) established a "special" classification of 21° C for this segment of the river, with the following modifying language:

Temperature shall not exceed 21° C due to human activities. When natural conditions exceed 21° C no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3° C; nor shall such temperature increases, at any time, exceed $t=34/(T+9)$.

This criterion, and the impacts of the City's discharge to receiving water quality, are discussed further in the Temperature section of this fact sheet, on the following page.

As required by the previous permit, the City carried out a program of monitoring to characterize priority pollutants in the Yakima River. Ambient metals data and the associated water quality criteria are presented in the REASPO TLXS spreadsheet and toxic organic compounds data are summarized in Table 17. Pesticides were not detected in the receiving water samples.

Consideration of Surface Water Quality-Based Limits for Numeric Criteria

Pollutant concentrations in the discharge exceed water quality criteria with technology-based controls, which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of a simple mass balance calculation. The dilution factors have been determined to be (from Appendix C):

Table 13: Dilution Factors

	Acute	Chronic
Aquatic Life	1.51	6.61
Human Health, Carcinogen		10.27
Human Health, Non-carcinogen		7.33

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

BOD₅--Under critical conditions there was a prediction of a violation of the dissolved oxygen criterion for the receiving water. The impact of BOD on the receiving water was modeled using DOSAG2 XLS. The discharge was modeled utilizing data as indicated in the annotated spread-sheet. The spreadsheet used to determine dissolved oxygen impacts is shown in Appendix C.

Due to the fact that the treatment plant is undergoing material upgrade, the need for water quality-based effluent limits cannot be determined at this time. With better data and a more sophisticated model, it may be determined that water quality-based limits are not necessary, in which case the final limits will be the technology-based limits derived from the secondary treatment standards.

This permit establishes the secondary treatment standards as the interim BOD₅ limits, rather than performance-based limits, because the City is carrying out the study to treat Del Monte's process wastewater and the treatment plant is undergoing significant modifications. The study of BOD in the effluent, and the consequent oxygen demand on the river, is required to be addressed in the final *Facility Plan*.

Temperature--State regulations contain a special condition for this parameter, applicable from the mouth of the river to river mile 185.6, near Cle Elum. The special condition consists of a revision of the water quality criterion to 21 °C.

The impact of the discharge on the temperature of the receiving water was modeled by simple mass-balance mixing analysis at critical condition. The receiving water temperature at the critical condition is 19.9 °C and the effluent temperature is 24 °C. The predicted resultant temperature at the boundary of the chronic mixing zone is 20.5 °C and the incremental rise is 0.6 °C.

Although the analysis did not predict a violation of the temperature criterion for the receiving water (21 °C), there is a violation of the Antidegradation policy, a narrative expression of the State's Surface Water Quality Standards.

In addition to the 21 °C criterion, WAC 173-201A-130(141) describes two further criteria the City must satisfy to demonstrate compliance with the temperature criterion. They are:

When natural conditions exceed 21 °C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3 °C; nor shall such temperature increases, at any time, exceed $t = 34/(T+9)$.

'T' represents the background temperature, and 't' represents the maximum permissible temperature increase measured at the chronic mixing zone boundary.

The first condition, relating to the maximum 0.3 °C increase, does not apply to the City's discharge because the 90th percentile ambient temperature is 19.9 °C.

Concerning the algorithmic condition, the maximum allowable increase was calculated as follows:

$$t = 34/(T+9)$$

$$t = 34/(19.9+9)$$

$$t = 1.18$$

Using the mass-balance calculation, the predicted incremental increase was determined to be 0.6 °C, which appears to satisfy the condition.

This permit does not establish effluent limits because the treatment plant is undergoing modifications. In lieu of effluent limits, this permit requires the City to carry out a program of receiving water sampling for temperature and several parameters. The goal of this receiving water monitoring is to collect site-specific data, upstream of the outfall, which can be used to evaluate impacts of the treatment plant's discharge on the receiving water. These data will be used to evaluate the need for temperature effluent limits at the next permit renewal. (In addition, these data will be used in development of the next permit to calculate water quality criteria for ammonia and the reasonable potential determination for ammonia.)

pH--The impact of pH and temperature were modeled using the calculations from EPA, 1988. The input variables were a chronic dilution factor of 6.61, upstream temperature 19.9 °C, upstream pH 8.7, upstream alkalinity 50 (as mg CaCO₃/L), effluent temperature 24.04 °C, effluent pH of 7.03, and effluent alkalinity 150 (as mg CaCO₃/L).

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. The modeled pH at the edge of the chronic mixing zone is 7.49. This result is expected because the river's characteristically high pH values is offset by the treatment plant's relatively low pH values. Effluent pH values are typically between 6 and 7. Therefore, the technology-based effluent limitations for pH was placed in the permit.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the 90th percentile of effluent data for 2000-2001, or 113 organisms per 100 mL, and a dilution factor of 6.61. The 95th percentile receiving water concentration was 141 organisms per 100 mL. The mass balance calculation is presented in Appendix C.

According to data collected by the Department's own monitoring program, the river itself is apparently out of compliance with the surface water quality standard of 100 organisms per 100 mL. This permit establishes interim effluent limits based on the secondary treatment standards. Although the most current Water Quality Program guidance, dated 12/24/01, states that performance-based effluent limits should be established, the permit writer decided to establish the limits based on the secondary treatment standards because the treatment plant is currently undergoing an upgrade. The City is required to address compliance with the fecal coliform bacteria water quality criteria in the final Facility Plan required by this permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

Table 7 contains a list of the toxic pollutants that were determined to be present in the discharge, in addition to ammonia. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit. Analysis of reasonable potential for each pollutant to exceed the water quality standards is explained in the following paragraphs. Pollutants are addressed by category: ammonia, metals and the remaining priority pollutants.

Ammonia

The necessity for ammonia effluent limits for the Permittee's discharge, and their calculation, are based upon several factors: the State's Surface Water Quality ammonia criteria, historical levels of ammonia in the City's discharge, and background ammonia concentrations in the river. The ammonia criteria are, in turn, calculated using site-specific temperature and pH data resulting from river sampling.

Normally, the receiving water pH is used in the calculation of ammonia criteria. However, because the background pH of the Yakima River is almost always above 8, this calculation resulted in extremely low ammonia criteria. Therefore, the pH within the mixing zones was recalculated using the Department's standard spreadsheet developed for this purpose, phmix.xls. Seasonal, ninetieth percentile effluent temperature, pH and alkalinity values were used in the calculation, as were the ninetieth percentile receiving water temperature and pH values. However, receiving water alkalinity data were not available; the estimated value of 25 mg/L as CaCO₃ was used in the spreadsheet. Incorporation of effluent and receiving water temperature and alkalinity values into the calculation resulted in significantly lower mixing zone pH values.

Table 14: Recalculated Mixing Zone pH Values

Acute MZ pH	Chronic MZ pH
7.04	7.35

The lower pH values, in turn, raised the ammonia criteria of the river. (See the Calculation of Ammonia Concentration and Criteria for Fresh Water spreadsheet.)

Table 15: Ammonia Water Quality Criteria

Acute NH ₃ Criterion	Chronic NH ₃ Criterion
18.7 mg/L	1.47 mg/L

Raising of the criteria resulted in a determination of no reasonable potential for the discharge to exceed the water quality standards for ammonia. (See the REASPOT.XLS spreadsheet.)

However, due to anti-backsliding prohibitions in State and Federal regulations, the permit will retain the ammonia effluent limits established in the previous permit:

Table 16: Ammonia Effluent Limits in this Permit

Monthly Average	Daily Maximum
4.16 mg/L	12.3 mg/L

The final ammonia limits in this permit are designated as 'to be determined' because the City is in the midst of an upgrade to the treatment plant. Special Condition S11.A requires submittal of a final *Facility Plan*, in which is required a water quality evaluation to determine compliance with the water quality standards. The Effluent and Receiving Water Study conducted by the City in 1998 and 1999 addressed metals, pesticides and other priority pollutants, but did not address ammonia. The water quality evaluation in the final *Facility Plan* is required to address compliance with the ammonia standards.

Residual Chlorine

The residual chlorine effluent limits in S1 A1 remain unchanged from the previous permit. (During the previous permit cycle, the City's laboratory revised the instrument detection level of its residual chlorine analytical process, from 0.6 µg/L to 6.0 µg/L.)

Metals

The determination of reasonable potential for metals in the discharge to exceed the water quality criteria was conducted using the Department's standard spreadsheet, REASPOT.XLS, a copy of which can be found in Appendix C of this fact sheet. The effluent and ambient data and the relevant water quality criteria used in the analysis can be found in the spreadsheet. Column headings in the table correspond to headings in the spreadsheet.

Many of the metals criteria are hardness-dependent and are calculated utilizing hardness present in the water. Pollutants with hardness-dependent criteria relevant to the Permittee's discharge are cadmium, trivalent chromium, copper, lead, nickel, silver and zinc. The water quality criteria for these metals assumes a hardness of 29.44 mg/L as CaCO₃ at the edge of the acute mixing zone and a hardness of 23.43 mg/L as CaCO₃ at the edge of the chronic mixing zone. These mixing zone-specific hardnesses were calculated using a simple mass balance calculation.

Two spreadsheet columns which require discussion are those which contain the acute and chronic metals translator values. Federal regulations require water quality criteria to be expressed as the 'dissolved' fraction of a metal and effluent limits to be expressed as 'total recoverable'. A 'translator' value is applied to predict the amount of metal (as total recoverable) that will become the dissolved fraction in the receiving water. The translator values in the spreadsheet are not the standard default values developed by EPA. Federal regulations allow adjustment of translators on a site-specific basis.

when data are available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge. The City utilized this option by splitting river samples and analyzing for both total recoverable and dissolved fractions and developing site-specific translator values.

Reasonable potential for metals in the discharge to exceed the water quality standards was found for copper, lead, silver and zinc. Effluent limits for these pollutants are not established in this permit because there does not exist, at this time, a cost-effective treatment technology to remove these metals from the discharge. This permit requires the City to continue carrying out a program of WET Testing to assess the aggregate toxicity of the discharge. In addition, the enhanced metals monitoring requirement associated with the pretreatment portion of this permit, along with results of the receiving water and effluent study, will provide data with which the need for effluent limits can more accurately be evaluated at the next permit renewal.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

Toxic Organic Compounds

The previous permit required the City to implement a program characterizing toxic organic compounds in its effluent and the receiving water to gather data for the reasonable potential analysis in this permit. Data summarizing organic compounds detected in the City's effluent are presented in Table 7 of this fact sheet. The names of pollutants that were detected at least once in the receiving water and their respective concentrations are detailed in the table below. The reasonable potential spreadsheet (REASPO T XLS) contains analyses for the organic compounds regulated by U.S. EPA in its *Quality Criteria for Water*. This document contains water quality criteria for organic compounds based on toxicity to aquatic organisms. (Analyses of the City's discharge for compliance with the human health criteria is discussed later in this fact sheet.)

The river was sampled for toxic organic compounds 5 times during the previous permit cycle, once per month from August through December 1999. For most of the samples analyzed, the practical quantitation level (PQL) was 0.4 µg/L, and the method detection level (MDL) varied as indicated in the table. The overwhelming majority of the results were non-detects. Only pollutants with at least one detection are reported in the table. Generally, pollutants that were detected in the samples were present at a level between the MDL and the PQL; such pollutant concentrations are flagged as estimates in the lab reports.

Table 17: Yakima River Characterization of Toxic Organic Compounds

Parameter	Units	Maximum Value	MDL	Number of Detections
Bromodichloromethane	µg/L	0.054	0.04	1
n-Butylbenzene	µg/L	0.15	0.057	1
Butylbenzylphthalate	µg/L	0.076	0.071	1
Chloroform	µg/L	5.1	0.049	1
Di-n-Butylphthalate	µg/L	5.9	0.15	3
1,4-Dichlorobenzene	µg/L	1.8	0.13	1
cis-1,2-Dichloroethene	µg/L	0.06	0.031	1
Ethylbenzene	µg/L	0.067	0.048	1
4-Isopropyltoluene	µg/L	1.6	0.048	1
Methylene chloride	µg/L	1.3	0.13	1
Naphthalene	µg/L	0.2	0.13	1
Styrene	µg/L	0.071	0.058	1
Tetrachloroethene	µg/L	1.5	0.037	1
Toluene	µg/L	1.3	0.047	3
Trichloroethene	µg/L	0.089	0.033	1
1,1,1-Trichloroethane	µg/L	0.15	0.026	1
1,3,5-Trimethylbenzene	µg/L	0.18	0.054	1
1,2,4-Trimethylbenzene	µg/L	0.61	0.058	1
m,p-Xylene	µg/L	0.24	0.086	1
o-Xylene	µg/L	0.12	0.049	1

The September monitoring event revealed no toxic organic compounds present in the sample. The October and December samples each indicated the presence of 1 compound and analysis of the November sample revealed the presence of 3 compounds. The majority of the 'hits' listed in the table occurred in the August sample.

Next, a reasonable potential analysis was done to determine whether toxic organic compounds in the discharge are likely to cause violations of the surface water quality standards to protect aquatic life. The spreadsheet used for the analysis, REASPOt XLS, may be found in Appendix C. Only three of the compounds present in the discharge were also found in the receiving water; therefore, the column to insert ambient data is mostly blank (zero).

As the spreadsheet illustrates, none of the organic compounds found in the City's effluent at the reported concentrations is predicted to exceed the water quality standards. Furthermore, the maximum effluent concentration reported for each compound is nearly always a fraction of the respective criteria. The only exceptions were bis-2-ethylhexyl phthalate and diethyl phthalate, for which dilution was sufficient to predict compliance. It should be noted that these organic compounds are present in the City's effluent at levels typical of a treatment plant in a City the size of Yakima's, and with the profile of industries discharging to the facility.

One of the base-neutral compounds, di-n-octal phthalate, was present in the discharge, but apparently there are no established criteria regulating this substance; therefore, the environmental impacts of this compound could not be evaluated. However, the impacts of this compound to the aquatic environment is at least partially evaluated through whole effluent toxicity (WET) Testing, although it is one of an aggregate of all the toxic constituents in the discharge.

On the basis of the preceding narrative, this permit contain neither effluent limits nor routine monitoring for any of the toxic organic compounds. However, the City is required to recharacterize its effluent for these compounds during this permit cycle and collect enough data so that a reasonable potential analysis can be conducted at the writing of the next permit in approximately 5 years. Furthermore, the City must abide by the whole effluent toxicity (WET) testing requirements of this permit, which monitors the *aggregate* toxicity of the discharge.

Pesticides

The treatment plant's effluent was characterized for pesticides in June, August, September, October and November of 1999. The sampling program was focused on the fall because pesticides are most likely to be present in the wastewater during the fall fruit processing season. Samples were scrutinized for 24 common analytes. The only sample in which pesticides were found to be present was taken on September 14th. The results of this analysis were as follows:

Table 18: Results of Effluent Analysis for Pesticides

Parameter	Units	Result	Quantitation Limit
Beta BHC	µg/L	0.124	0.050
Beta Endosulfan	µg/L	0.163	0.10

The determination of reasonable potential for pesticides in the effluent to exceed the aquatic water quality standards revealed that concentrations of Beta Endosulfan at the edges of the acute and chronic mixing zones were predicted to exceed the respective water quality criteria. The analysis showed no potential for Beta BHC to exceed the water quality criteria.

Effluent limits are not established for Beta Endosulfan because the treatment plant is undergoing upgrade. Furthermore, the final *Facility Plan* being developed by the City will present an excellent opportunity for the City to evaluate the discharge after collecting more data and applying a more sophisticated water quality model than the rudimentary spreadsheets used by the Department.

Whole Effluent Toxicity

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

Summary of WET Testing Activities During the Previous Permit Cycle

The City submitted a summary report of all WET Testing that occurred during the previous permit cycle, from October 1997 to June of 2002. In 1997, the effluent failed to meet the chronic WET limits and accelerated testing was initiated. A toxicity identification/reduction evaluation (TI/RE) was initiated in July 1998 to determine the cause of toxicity. The TI/RE study plan prescribed a schedule of chronic toxicity that was concentrated in the summer and fall months to coincide with increased industrial discharges, a period when toxicity historically had been observed. The TI/RE progressed through 1998 and 1999; however, the test results were inconclusive. The toxicity was too intermittent for the TI/RE to be conclusive.

For monitoring in 2000-2001, the Department issued Order No. DE 99WQ-C137, which required the City to return to routine acute and chronic WET Testing, but on a schedule concentrated in the summer and fall months. During this period, the effluent has been in compliance with the WET limits. A test in September 2001 indicated chronic toxicity above the CCEC limit. However, the Department determined the test result was 'anomalous' because the data did not fit the normal expected pattern of toxicity. Two accelerated tests conducted in October 2001 indicated some toxicity, but at levels meeting permit limits. Monitoring since issuance of the Order indicates a continuing seasonal trend of low-level toxicity (i. e., within permit limits, but measurable). Low-level toxicity in the discharge was found in samples taken in October and November 1999, September, November and December 2000, and November and December 2001. This seasonal toxicity coincides with the height of the fruit packing industry's discharge activities.

A plant performance review was initiated to look for possible correlations between toxicity and treatment plant performance. The results suggested that the plant was performing as expected and that there were no observable relationships between plant performance and toxicity.

The treatment plant's effluent has historically shown a seasonal pattern of toxicity. Increased toxicity has been observed in the fall and early winter months. This period coincides with relatively low treatment plant flows and relatively high production activity within the fruit packing industry, which represents a major industrial source of wastewater to the treatment plant. The TI/RE work conducted in 1998 and 1999 indicated that one of the toxicants was a short-lived organic compound fitting the profile of certain fungicides and biocides used by fruit packers (Parametrix, 1999). The short half-life of the toxicant, suggested by the TI/RE testing, implies that the toxicant will not persist in the receiving waters.

A source investigation of fruit packers and other industries was conducted in 1999 (Parametrix, 1999). The investigation determined that at least two apple packers were discharging wash water containing the fungicide thiabendazole (TBZ) at potentially toxic concentrations. Further efforts were made to correlate effluent toxicity with concentrations of TBZ and other fungicides and biocides present in the treatment plant effluent. However, because of the intermittent discharge practices of the fruit packing industry, the tests revealed a lack of toxicity when TBZ and other fungicides were undetected in the effluent.

Following the source investigation, the City required the two fruit packers to discontinue discharging their TBZ drench tanks to the sanitary sewer. The City also informed other fruit packers of the same stipulation on TBZ. Since this control measure on TBZ was initiated in early 2000, the treatment plant has maintained compliance with the WET limits. (Summary Report, pp.1-3)

WET Limits

In past tests, acute toxicity was found to be present at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity. An acute toxicity limit was established in the previous permit. The acute toxicity limit was set relative to the zone of acute criteria exceedance (acute mixing zone) established in accordance with WAC 173-201A-100. The acute critical effluent concentration (ACEC) is the concentration of effluent existing at the boundary of the acute mixing zone during critical conditions. The acute toxicity limit was no statistically significant difference in test organism survival between the ACEC, 66.2% of the effluent, and the control.

The City has not had any acute toxicity found in its effluent since November 1997. Therefore, the acute WET limit established in the previous permit is not contained in this permit. The City is required to continue monitoring its discharge for acute toxicity, but on a reduced frequency and utilizing a different test organism.

In past tests, chronic toxicity was found to be present at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity. A chronic toxicity limit was established in the previous permit. The chronic toxicity limit is set relative to the mixing zone established in accordance with WAC 173-201A-100. The chronic critical effluent concentration (CCEC) is the concentration of effluent existing at the boundary of the mixing zone during critical conditions. **The chronic toxicity limit is no statistically significant difference in test organism response between the CCEC, 15.1 % of the effluent, and the control.**

Monitoring for compliance with a chronic toxicity limit is accomplished by conducting a chronic toxicity test using a sample of effluent diluted to equal the CCEC and comparing test organism response in the CCEC to organism response in nontoxic control water. **The Permittee is in compliance with the chronic toxicity limit if there is no statistically significant difference in test organism response between the CCEC and the control.** In recognition of the low level of toxicity in the discharge, and the City's efforts during the previous permit cycle to reduce and prevent introduction of toxic substances into its treatment works, the sampling frequency for chronic toxicity is reduced from six times annually to two times annually.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard". The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

Human Health

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent is likely to have chemicals of concern for human health. The discharger's high priority status is based on the discharger's status as a major discharger and knowledge of data or process information indicating regulated chemicals occur in the discharge. The source of regulated chemicals in the effluent is at least partially due to industrial discharges to the POTW.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). One of the base-neutral compounds, di-n-octal phthalate, was present in the discharge, but apparently there are no established criteria regulating this substance; therefore, the environmental impacts of this compound could not be evaluated. However, the impacts of this compound to the aquatic environment is at least partially evaluated through WET Testing, as it is one of an aggregate of all the toxic constituents in the discharge.

The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards; thus, effluent limits for these effluent constituents are not warranted. The discharge will be reevaluated for human health impacts at the next reissuance of the City's permit in

approximately 5 years. The Department's standard spreadsheet, HUMAN-H.XLS, was used for this analysis and may be found in Appendix C of this fact sheet.

Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the Sediment Quality Standards, an order will be issued to require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground; therefore, no limitations are established in this permit. This permit does not authorize any further discharges of process wastewater to the inactivated Industrial Waste Sprayfield; however, application of irrigation water to sustain the plant community is not regulated by this permit.

COMPARISON OF EFFLUENT LIMITS WITH THE PREVIOUS PERMIT

Previous Permit

Discharge to the Yakima River

The previous permit contained concentration-based and mass loading effluent limits for this discharge as follows:

Table 19: River Discharge Effluent Limitations in the Previous Permit

EFFLUENT LIMITATIONS: #001			
Parameter	Monthly Average	Weekly Average	Daily Maximum
BOD ₅	30 mg/L; 4,905 lbs/day	45 mg/L; 7,358 lbs/day	N/A
TSS	30 mg/L; 5,250 lbs/day	45 mg/L; 7,875 lbs/day	N/A
Fecal Coliform Bacteria	200 #colonies/100 ml	400 #colonies/100 ml	N/A
pH	Shall not be outside the range of 6.0 to 9.0		
Ammonia, Total	4.16 mg/L	N/A	12.3 mg/L
TRC	0.012 mg/L	N/A	0.029 mg/L

Discharge to the Sprayfield

The previous permit contained interim and final effluent limits for this discharge as follows:

Table 20: Interim Sprayfield Effluent Limitation in Previous Permit

INTERIM EFFLUENT LIMITATIONS: OUTFALL # 002		
Parameter	Units	Daily Maximum
Flow	MGD	0.75

Final sprayfield effluent limits were proposed in the Sprayfield Engineering Report required by the permit. The limits were included in an update to the Industrial Waste Sprayfield Operational Guidelines and Monitoring Schedules submitted to the Department in December 2000 and approved the following month. Monthly loading limits to the sprayfield were established for Flow, BOD, Nitrogen and Potassium. However, because the City decided to discontinue use of the sprayfield and this permit does not authorize process wastewater discharges to the sprayfield, the final limits are not included in this fact sheet.

Proposed Permit

Discharge to the Yakima River

This permit contains interim and final effluent limits for the discharge to the river. Interim BOD and TSS limits are concentration-based only, as there is uncertainty about the validity of the current design flows, from which mass loadings limits are derived. Final limits indicated as TBD will be established during the permit cycle based on findings of the water quality evaluation to be included in the final *Facility Plan*.

Table 21: River Discharge Effluent Limitations in the This Permit

EFFLUENT LIMITATIONS: #001				
Parameter	INTERIM LIMITATIONS		FINAL LIMITATIONS	
	Average Monthly	Average Weekly	Average Monthly	Average Weekly
BOD ₅	30 mg/L	45 mg/L	TBD mg/L; TBD lbs/day	TBD mg/L; TBD lbs/day
TSS	30 mg/L	45 mg/L	30 mg/L; TBD lbs/day	45 mg/L; TBD lbs/day
Fecal Coliform Bacteria	200/100 #/mL	400/100 #/mL	TBD #/mL	TBD #/mL
pH	Between 6 and 9.		Between 6 and 9.	
TRC	0.012 mg/L	0.029 mg/L	TBD mg/L	TBD mg/L
Total Ammonia, as N	4.16 mg/L	12.3 mg/L	TBD mg/L	TBD mg/L

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved. The schedule for the routine monitoring of influent and effluent parameters is detailed in this permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for activated sludge plants with a design flow of greater than 5 MGD (pp. XIII-43).

Given the profile of industries discharging to the POTW, the large size of the treatment plant, and the City's fully delegated pretreatment status, this permit contains an extensive monitoring program of conventional and nonconventional pollutants, priority pollutants scans, WET Testing and receiving water sampling. Specifically, State and Federal regulations require (1) routine monitoring of conventional and toxic substances in the influent and effluent, (2) priority pollutant monitoring associated with the pretreatment program, (3) effluent and receiving water monitoring of metals to collect data for future reasonable potential determinations, and (4) WET Testing.

The permit writer attempted to minimize sampling redundancy and coordinate sampling events. However, the minimization of monitoring was made difficult by the different methods and goals of the monitoring requirements, and the lack of dilution in the receiving water that resulted in reasonable potential for several effluent pollutants.

All monitoring associated with Federal pretreatment requirements are contained in Special Condition S6.B. As a pretreatment POTW, the City of Yakima is required to have influent, final effluent, and sludge sampled for toxic pollutants in order to characterize the industrial input. Sampling is also done to determine if pollutants interfere with the treatment process or pass through the plant to the sludge or the receiving water. In an effort to minimize costs, quarterly testing is required only for metals, and then only for those metals that indicated a reasonable potential to exceed the water quality standards when they were present in the effluent. The monitoring data will be used by the Department and the City to assess the adequacy of local limits, on a continuing basis, which commercial and industrial users must meet.

The Department requires major municipal dischargers to sample effluent and the receiving water concurrently to collect data to determine the reasonable potential for metals in the effluent to exceed the surface water quality standards. The Department is authorized to require this additional monitoring by the City in WAC 173-201A-040(2). The effluent and receiving water study is detailed in Special Condition S10 of the permit. When sampling of the effluent for the receiving water study coincides with pretreatment sampling of effluent for metals, the City must sample the ten metals specified in S10, rather than only the four specified in S6.

WET Testing is required on the basis of the industrial facilities discharging to the City's treatment plant, the establishment of WET limits in the previous permit and continued in this permit, and the pollutants in the discharge that indicate a reasonable potential to violate the water quality standards.

The City is strongly encouraged to coordinate discrete sampling events, whenever possible, to allow the correlation of data to the maximum degree possible. For instance, it is anticipated that some WET sampling events will coincide with quarterly sampling for metals in the effluent required by the receiving water study (S10.A), and perhaps the annual influent priority pollutant scan associated by the pretreatment requirements (S6.B). Coordinating the timing of these discrete sampling events may be very useful. If the WET Test fails, a priority pollutant scan taken concurrently could help determine the cause of the noncompliance. It may be helpful to schedule an influent pretreatment sample a day or two before the effluent sample, taking into account retention time of the wastewater in the treatment plant.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current State and local solid waste management program and also by EPA under 40 CFR 503.

This permit requires the City to continue ground water monitoring as specified in Appendix C of the O&M Manual. The most recent Department-approved monitoring program became effective May 1, 2001.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for the parameters listed in Table 22. The laboratory is accredited for more than one analytical method for the following parameters: Residual Chlorine, Fecal Coliforms, and Total Coliforms.

Table 22: Yakima POTW Laboratory Accredited Parameters

General Chemistry	Trace Metals	Trace Metals	Microbiology
Alkalinity	Antimony	Manganese	Fecal Coliforms
Ammonia	Arsenic	Mercury	Total Coliforms
BOD/CBOD	Beryllium	Molybdenum	
Chloride	Cadmium	Nickel	Organics
Residual Chlorine	Calcium	Potassium	Organochlorine Pesticides
DO	Chromium	Selenium	Polychlorinated Biphenyls
Hardness	Copper	Silver	Volatile Aromatics
Ph	Iron	Sodium	Volatile Halocarbons
TSS	Lead	Thallium	
Sulfite	Magnesium	Zinc	
Hexane Extractable Material			

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The requirements of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow. Two important components of treatment plant loadings addressed in this portion of the permit are (hydraulic) infiltration and inflow, and (organic) wasteloads.

INFLOW AND INFILTRATION (I&I)

The City has implemented an aggressive program to reduce I&I in the collection system since 1990. Sewers are inspected using a television camera. Grouting of leaking sewer lines has been the preferred approach for reduction of I&I. In addition, the City rehabilitates an average of 15 manholes per year.

The City submitted three I&I evaluations during the previous permit cycle, the first in May 1999, the second as part of the draft *Facility Plan* (Section 10.3) in December 2000, and the third in January 2002. Infiltration into the collection system was analyzed by averaging influent treatment plant flows from the summer, when the groundwater table is high and there is little rainfall. The infiltration analysis in the draft *Facility Plan* found a flow of 128 gallons per capita per day (gpcd), which exceeds the EPA criteria of 120 gpcd. For this reason, the permit requires the City to submit I&I Evaluations annually throughout this permit cycle.

The City evaluated inflow into the collection system during a rainstorm that occurred from December 30, 1996 to January 1, 1997. The storm deposited 2.17 inches of rain and resulted in an estimated 5.7 MGD of inflow to the treatment plant. The assessed inflow was calculated to be 150 gpcd, significantly less than EPA's criterion of 275 gpcd. (*Facility Plan*, Section 10, p.15)

WASTELOAD ASSESSMENT

The previous permit did not require submittal of a wasteload assessment; however, the draft *Facility Plan* contains an assessment in Section 4. As was discussed in the Wastewater Characterization section of this fact sheet, influent loadings to the treatment plant exceeded design loadings for 4 months during the experiment in which Del Monte's process wastewater was treated by the main treatment plant. Furthermore, influent loadings exceeded the 85 % planning threshold during

January, March and April 2001, when Del Monte was *not* discharging to the City. Its worth noting that there exists some uncertainty of the current design loadings of the treatment plant, which was discussed in the Design Criteria section of this fact sheet. For these reasons, this permit requires a comprehensive wasteload assessment in the required final *Facility Plan*, and a second assessment with the application for permit renewal. The second assessment is required because it will reflect any changes in treatment capacity the City implements at the treatment plant during the second half of the permit cycle.

OPERATION AND MAINTENANCE (O&M)

This permit contains Special Condition S5, as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in Special Condition S7, to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the Yakima County Health District.

Requirements for monitoring sewage sludge and recordkeeping are included in this permit. This information will be used by Ecology to develop or update local limits and is also required under 40 CFR 503.

PRETREATMENT

To provide more direct and effective control of pollutants discharged, this permit delegates to the City of Yakima permitting, monitoring and enforcement authority for industrial users discharging to its POTW. The Department oversees the delegated Industrial Pretreatment Program to assure compliance with Federal pretreatment regulations (40 CFR Part 403) and categorical standards and State regulations (Chapter 90.48 RCW and Chapter 173-216 WAC).

According to the most recent NPDES permit application submitted to the Department, the POTW receives discharges from 29 non-categorical Significant Industrial Users (SIUs) and 14 Categorical Industrial Users (CIUs) from industries located within the City. In addition, there are 1 confirmed and 7 'suspected' SIUs discharging to the system from the City of Union Gap. A suspected SIU is a facility whose discharge has not been fully characterized or, if characterization has been completed, who has been suspected of causing problems to the collection system or treatment plant. In the context of the number and variety of industrial facilities discharging to the City's POTW, this permit brings to culmination the process begun in 1988 to develop and implement a comprehensive, locally-

run pretreatment program. Specifically, this permit grants full pretreatment authority to the City of Yakima.

History

The NPDES permit issued in 1988 required the City "to develop the initial elements of a pretreatment program". Special Condition S5. of the permit briefly explained the required elements of the program.

Administrative Order No. DE 93WQ-C492, issued in October 1993, acknowledged the City's compliance with pretreatment requirements of the 1988 permit. In addition, the Order detailed further requirements that, upon the Department's approval, would authorize the City to administer a partial pretreatment program for commercial and industrial discharges to the POTW. The City requested partial delegation of the pretreatment program, as required by the Order, on February 13, 1995. The Department agreed to the request, and expressed in the 1997 NPDES Permit that it would work with the City to cooperatively implement the pretreatment program until the City had been delegated authority to implement the complete pretreatment program. Until full pretreatment delegation, the Department retained the right to issue State Waste Discharge Permits and the associated enforcement authority.

By the time the 1997 NPDES permit was in development the City had indicated its willingness to accept full pretreatment delegation. Consequently, Special Condition S8.F required that the City submit an application for delegation of pretreatment, containing all of the elements identified in 40 CFR 403.9, *POTW Pretreatment Programs and/or Authorization to Revise Pretreatment Standards: Submission for Approval*. The permit imposed additional requirements necessary to address the regional, multijurisdictional character of the POTW's service area. The additional requirements were:

1. A Sewer Use Ordinance;
2. Interlocal Agreements;
3. Local Limits; and,
4. Industrial User Survey.

Application for Delegation of Full Pretreatment Authority

The Department received the City's application for full pretreatment authority on June 30, 2000. The application is organized in 5 sections, or exhibits. Each section is described in the cover letter as follows:

1. A statement of legal authority for the City to administer the pretreatment program, the Sewer Use Ordinance which the City will use to regulate dischargers, the 'Master State Waste Discharge Permit Shell' from which the City will develop permits, and the relevant interlocal agreements and a determination of their adequacy;
2. A letter from the City Attorney describing the manner in which the pretreatment program will be administered;

3. A description of the City Wastewater Division responsible for implementing the pretreatment program, including staffing and funding levels;
4. A description of the City's technically-based local pretreatment limits; and,
5. The results of the City's Industrial User Survey.

The application was evaluated utilizing the EPA guidance document, Procedures Manual for Reviewing a POTW Pretreatment Program Submission, dated October 1983. (The manual does not have a document number.) The application was assembled by Preston, Gates and Ellis and appeared to be complete. The Department's review of the application indicated the main elements to be present; however, the adequacy of each element was not rigorously evaluated due to resource constraints. Similar to the review of an engineering document, the Department assumes that the City's legal consultants have included the necessary elements to allow successful implementation of the pretreatment program, and the Department lacks the resources to evaluate the complex details of the various interlocal agreements. Therefore, the Department has approved the application and this permit formally authorizes the City to implement its local pretreatment program.

An industrial user survey is required to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with Federal pretreatment regulations (40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act), with State regulations (Chapter 90.48 RCW and Chapter 173-216 WAC), and with local ordinances. The survey is required as part of the annual pretreatment report.

As sufficient data becomes available, the Permittee shall, in consultation with the Department, reevaluate its local limits in order to prevent pass through or interference. Upon determination by the Department that any pollutant present causes pass through or interference, or exceeds established sludge standards, the Permittee shall establish new local limits or revise existing local limits as required by 40 CFR 403.5. In addition, the Department may require revision or establishment of local limits for any pollutant that causes an exceedance of the Water Quality Standards or established effluent limits, or that causes whole effluent toxicity. The determination by the Department shall be in the form of an Administrative Order. In order to develop these local limits, the Department will provide environmental criteria or limits for the various pollutants of concern.

The Department may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern. Any permit modification is subject to formal due process procedures pursuant to State and Federal law and regulation.

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive,

or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

This permit requires the Permittee to develop and implement a plan for preventing the accidental release of pollutants to State waters and for minimizing damages if such a spill occurs.

The Permittee has developed a plan for preventing the accidental release of pollutants to State waters and for minimizing damages if such a spill occurs. This permit requires the Permittee to update this plan and submit it to the Department.

OUTFALL EVALUATION

Special Condition S12. requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

GENERAL CONDITIONS

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on August 16, 2001 in the Yakima Herald-Republic to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on December 23, 2002, in the Yakima Herald-Republic to inform the public that a draft permit and fact sheet were available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, Washington 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted.

The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's permit coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/575-2490, or by writing to the address listed above. This permit and fact sheet were written by Jim La Spina.

APPENDIX B -- GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring--Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C -- TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.wa.gov/ecology>.

CALCULATION OF pH WITHIN THE MIXING ZONES

Calculation of pH of a mixture of two flows. Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93
Based on Warm Weather Data for July, August and September

INPUT		
1	DILUTION FACTOR AT MIXING ZONE BOUNDARY	Acute 1.51 Chronic 6.61
1.	UPSTREAM/BACKGROUND CHARACTERISTICS	
	Temperature (deg C): 90th percentile	19.90 19.90
	pH: 90th percentile	8.70 8.70
	Alkalinity (mg CaCO3/L): Guesstimate	25.00 25.00
2.	EFFLUENT CHARACTERISTICS	
	Temperature (deg C): 90th percentile	24.30 24.30
	pH: 90th percentile	6.99 6.99
	Alkalinity (mg CaCO3/L): 90th percentile	117.00 117.00
OUTPUT		
1.	IONIZATION CONSTANTS	
	Upstream/Background pKa:	6.38 6.38
	Effluent pKa:	6.35 6.35
2.	IONIZATION FRACTIONS	
	Upstream/Background Ionization Fraction:	1.00 1.00
	Effluent Ionization Fraction:	0.81 0.81
3.	TOTAL INORGANIC CARBON	
	Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	25.12 25.12
	Effluent Total Inorganic Carbon (mg CaCO3/L):	144.06 144.06
4.	CONDITIONS AT MIXING ZONE BOUNDARY	
	Temperature (deg C):	22.81 20.57
	Alkalinity (mg CaCO3/L):	85.93 38.92
	Total Inorganic Carbon (mg CaCO3/L):	103.89 43.11
	pKa:	6.36 6.38
	pH at Mixing Zone Boundary:	7.04 7.35

Calculation Of Ammonia Concentration and Criteria for fresh water.

Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

Incorporates recalculated pH values at the edges of the acute and chronic mixing zones.

INPUT	ACUTE	CHRONIC
1 Ambient Temperature (deg C; $0 < T < 30$)	19.9	19.9
2 Ambient pH ($6.5 < \text{pH} < 9.0$)	7.04	7.35
3 Acute ICAP (Salmonids present- 20; absent- 25)	20	20
4 Chronic ICAP (Salmonids present- 15; absent- 20)	15	15
OUTPUT		
1. Intermediate Calculations:		
Acute FT	1.01	1.01
Chronic FT	1.41	1.41
FPH	2.63	1.70
RATIO	28	21
pKa	9.40	9.40
Fraction Of Total Ammonia Present As Un-ionized	0.4305%	0.8751%
2. Un-ionized Ammonia Criteria		
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH ₃ /L)	98.1	152.1
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH ₃ /L)	7.6	15.6
3. Total Ammonia Criteria:		
Acute Total Ammonia Criterion (mg NH ₃ + NH ₄ /L)	22.8	
Chronic Total Ammonia Criterion (mg NH ₃ + NH ₄ /L)		1.8
4. Total Ammonia Criteria expressed as Nitrogen:		
Acute Ammonia Criterion as mg N	18.7	
Chronic Ammonia Criterion as N		1.47

WATER QUALITY CRITERIA

SPREADSHEET CREATED BY D. NUNNALLEE, REV. 1-92 BY G. SHERVEY									
last revision date 7/99		FILENAME:		RUN DATE: 12/12/2002		PREPARED BY:			
FACILITY: YAKIMA STP									
WATER QUALITY CRITERIA/ (in ug/L unless otherwise noted)									
Assumes a hardness of 15.3 mg/L (5th percentile)		PRIOR	CAR	Water Quality Criteria		Human Health Cri			
		ITY	CIN	acute	Fresh chronic	Fresh	Source and Comments	Acute	Metals Translators
Pollutant, GAS No. & Application Ref. No.		PLTNT	GEN?						Freshwater
ARSENIC (dissolved) 7440382 2M		Y	Y	360	190		WAC 173-201A	1.00	1.00
CADMIUM - 7440439 4M Hardness dependent		Y	N	0.77	0.35		WAC 173-201A	0.943	0.943
CHROMIUM									
COPPER - 744058 6M Hardness dependent		Y	N	4.34	3.28		WAC 173-201A	0.996	0.996
LEAD - 7439921 7M Dependent on hardness		Y	N	7.97	0.31		WAC 173-201A	0.466	0.466
MERCURY 7439976 8M		Y	N	2.10	0.012	0.14	WAC 173-201A, NTR - HH	0.85	
NICKEL - 7440020 9M Dependent on hardness		Y	N	289.15	32.11	610	WAC 173-201A, NTR	0.998	0.997
SILVER - 7740224 11M dependent on hardness.		Y	N	0.14	NA		SEE WAC 173-201A, acute level	0.85	
THALLIUM 7440280 12M		Y	N	1400	40	1.70	Gold Book, NTR - HH		
ZINC- 7440666 13M hardness dependent		Y	N	23.32	21.30		WAC 173-201A	0.996	0.996
CYANIDE 57125 14M		Y	N	22	5.20	700	WAC 173-201A, NTR		
BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B		Y	Y	940	3	1.8	Gold Book, NTR		
BUTYLBENZYL PHTHALATE 85687						3000.0	FR 63, 237-HH		
CHLOROFORM 67663 11V		Y	Y	28900	1240	5.70	Gold Book, NTR - HH		
DI-n-BUTYL PHTHALATE 84742 26B		Y	N			2700	NTR		
DI-n-OCTYL PHTHALATE									
1,3-DICHLOROBENZENE 541731 21B		Y	N	1120	763	400	NTR - HH		
1,4-DICHLOROBENZENE 106467 22B		Y	N	1120	763	400	NTR - HH		
DICHLOROBROMOMETHANE 75274 12V		Y	Y			0.27	NTR		
DIETHYL PHTHALATE 84662 24B		Y	N	940	3	23000	Gold Book, NTR - HH		
DINITROTOLUENE 2,4 121142 27B		Y	Y	330	230	0.11	Gold Book, NTR - HH		
METHYLENE CHLORIDE 75092 22V		Y	Y			4.7	NTR		
NAPHTHALENE 91203 39B		Y	N	2300	620		Gold Book		
NITROSODIPHENYLAMINE N 86306 43B		Y	Y			5	NTR		
PHENOL 108952 10A		Y	N	10200	2560	21000	Gold Book, NTR - HH		
TETRACHLOROETHYLENE 127184 24V		Y	Y	5280	840	0.80	Gold Book, NTR - HH		
TOLUENE 108883 25V		Y	N	17500		6800	Gold Book, NTR - HH		
TRICHLOROETHYLENE 79016 29V		Y	Y	45000	21900	2.70	Gold Book, NTR - HH		

DETERMINATION OF REASONABLE POTENTIAL TO EXCEED THE HUMAN HEALTH CRITERIA

Parameter	Ambient Concentration (Geometric Mean) ug/L	Water Quality Criteria for Protection of Human Health ug/L	Max concentration at edge of chronic mixing zone. ug/L	LIMIT REQ'D?	AVERAGE MONTHLY EFFLUENT LIMIT ug/L	MAXIMUM DAILY EFFLUENT LIMIT ug/L	Estimated Percentile at 95% Confidence	Pn	Max effluent conc. measured ug/L	Coef. Variation	S	# of samples from which # in col. K was taken	Multiplier
MERCURY	0.0	0.14	0.00	NO	NONE	NONE	0.50	0.72	0.026	0.60	0.6	9	0.73
NICKEL	0.0	610	0.17	NO	NONE	NONE	0.50	0.72	2.429	0.60	0.6	9	0.73
THALLIUM	0.0	1.70	0.01	NO	NONE	NONE	0.50	0.72	0.095	0.60	0.6	9	0.73
CYANIDE	0.0	700	0.72	NO	NONE	NONE	0.50	0.72	10.20	0.60	0.6	9	0.73
BIS(2-ETHYLHEXYL) PHTHALATE	0.0	1.80	0.44	NO	NONE	NONE	0.50	0.74	6.50	0.60	0.6	10	0.70
BUTYLBENZYL PHTHALATE	0.0	3000	0.01	NO	NONE	NONE	0.50	0.74	0.17	0.60	0.6	10	0.70
CHLOROFORM	0.0	5.70	0.24	NO	NONE	NONE	0.50	0.74	3.60	0.60	0.6	10	0.70
DI-n-BUTYL PHTHALATE	0.0	2700	0.68	NO	NONE	NONE	0.50	0.74	10.00	0.60	0.6	10	0.70
1,3-DICHLOROBENZENE	0.0	400	0.43	NO	NONE	NONE	0.50	0.74	6.28	0.60	0.6	10	0.70
1,4-DICHLOROBENZENE	0.0	400	0.07	NO	NONE	NONE	0.50	0.74	1.00	0.60	0.6	10	0.70
DICHLOROBROMOMETHANE	0.0	0.27	0.07	NO	NONE	NONE	0.50	0.74	0.97	0.60	0.6	10	0.70
DIETHYL PHTHALATE	0.0	23000	0.22	NO	NONE	NONE	0.50	0.74	3.30	0.60	0.6	10	0.70
DINITROTOLUENE 2,4	0.0	0.11	0.05	NO	NONE	NONE	0.50	0.74	0.78	0.60	0.6	10	0.70
METHYLENE CHLORIDE	0.0	4.70	0.15	NO	NONE	NONE	0.50	0.74	2.20	0.60	0.6	10	0.70
NITROSODIPHENYLAMINE N	0.0	5.00	0.02	NO	NONE	NONE	0.50	0.74	0.28	0.60	0.6	10	0.70
PHENOL	0.0	21000	1.02	NO	NONE	NONE	0.50	0.74	15.00	0.60	0.6	10	0.70
TETRACHLOROETHYLENE	0.0	0.80	0.04	NO	NONE	NONE	0.50	0.74	0.63	0.60	0.6	10	0.70
TOLUENE	0.0	6800	0.09	NO	NONE	NONE	0.50	0.74	1.29	0.60	0.6	10	0.70
TRICHLOROETHYLENE	0.0	2.70	0.01	NO	NONE	NONE	0.50	0.74	0.18	0.60	0.6	10	0.70
Beta BHC	0.0	0.0140	0.01	NO	NONE	NONE	0.50	0.55	0.124	0.60	0.6	5	0.93
Beta Endosulfan	0.0	0.930	0.01	NO	NONE	NONE	0.50	0.55	0.163	0.60	0.6	5	0.93

APPENDIX D -- RESPONSE TO COMMENTS

The Department received comments on the draft permit from the U. S. Environmental Protection Agency (EPA) and the City of Yakima. The Department's response follows each comment.

Comments received from EPA

EPA has completed review of the draft National Pollutant Discharge Elimination System (NPDES) permit for the referenced facility. Listed below are our comments and recommendations that we hope will assist you in preparing the permit for final issuance. EPA requests that Ecology provide a copy of the proposed final permit to the Seattle Regional Office for our review prior to issuance. This request is in accordance with procedures identified in our NPDES MOA (1989) between WDOE and EPA, and NPDES regulations (40 CFR § 123.44).

Comment 1: Section SI.A.2

The draft permit does not contain final effluent limitations necessary to protect receiving waters. The Clean Water Act at 301(b)(1)(B & C) states that in order to carry out the objective of the Act there shall be achieved for publicly owned treatment works effluent limitations based upon secondary treatment as defined by the Administrator pursuant to section 304(d)(1) of the Act; or any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedule of compliance, established pursuant to any State law or regulations, or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to the Act.

The draft permit does not adequately implement the Act by including interim limits for BOD-5, fecal coliform bacteria, and total ammonia that expire on December 31, 2003. There is no guarantee that the State will modify this permit prior to this date, which would result in violation of the Act at 402(o). Additionally, the draft permit does not include final effluent limitations for parameters (i.e., BOD-5, copper, lead, zinc, and beta endosulfan) that have been shown to have reasonable potential to violate State water quality standards.

EPA provides the following specific discussions and recommendations for each parameter of concern.

1. BOD-5

First, there are technology-based effluent limitations for BOD-5 as specified in both Federal and State regulations that must be implemented in the permit. Second, when determining the need for a water quality-based effluent limit for this parameter, the State needs to consider whether or not the technology-based effluent limit is protective of water quality standards. Therefore, reasonable potential must be determined using the

technology-based limit rather than the current performance of the facility. Since the State has already shown that levels of BOD-5 at 20 mg/L show violations of water quality standards for DO, it would be reasonable to assume that the technology-based effluent limit of 30 mg/L would also cause DO violations in the receiving water.

Recommendation: EPA understands that the State's intent was to re-evaluate the need for a water quality-based effluent limit after the permittee submitted the final Facility Plan. However, the State needs to provide final effluent limitations for BOD-5 based on either water quality or technology. The State should re-evaluate the need for a water quality-based effluent limit by conducting a water quality analysis of DO using the technology-based effluent limits. The State can implement the final limits through a compliance schedule and the final limits can be modified based on the final Facility Plan prior to the date of compliance without violating the Clean Water Act.

Ecology Response:

Although the Lower Yakima River (segments downstream of the Yakima facility) is listed as water quality-impaired for DO on the current 303(d) list, it is not possible for Ecology to determine reasonable potential for the Yakima STP effluent to cause or contribute to this situation. Ecology used the Streeter-Phelps model to evaluate the need for water quality-based effluent limits for the draft permit. The State considers the Streeter-Phelps model to be a screening tool to determine whether additional analysis is necessary when an impact is indicated. The results of this model indicated that additional analysis is necessary. However, due to multiple point and nonpoint sources that also contribute to the DO problem in this area, the State cannot adequately model the Yakima STP effluent without accounting for the other discharges. Specifically, other downstream dischargers to the river include: nine municipal treatment plants, two industrial food processors, 10 agricultural return drains, and seven small tributary streams that receive agricultural runoff.

The waters of the return drains and streams carry oxygen-demanding pollutants from many nonpoint sources that have not been fully characterized or quantified by the State. Since the State has already identified the need for a DO TMDL to determine point source waste load allocations and nonpoint load allocations, Ecology believes that it would not be appropriate to set single facility waste load allocations because BOD is not a conservative pollutant and requires a comprehensive assessment of all contributing sources in the watershed to ensure the long-term health of the Yakima River. Additionally, the facility has technology-based effluent limits in the permit that will prohibit the facility from further impairment of the Yakima River. The final permit will contain BOD effluent limitations based on the secondary treatment standards (a monthly average of 30 mg/L and weekly average of 45 mg/L).

2. Fecal Coliform

The State has both technology-based treatment standards and water quality standards for fecal coliform. Since the State has listed this segment of the Yakima River on the 1998 303(d) list for this parameter, the State must implement final effluent limits that will not cause or contribute to further impairment of water quality standards. The current exceedance of water quality standards for this pollutant indicates that the receiving water body does not have the assimilative capacity to accept an additional loading of this pollutant.

Recommendation: EPA recommends that the State implement the water quality criteria at the end-of-pipe. The State can implement the final limits through a compliance schedule and the final limits can be modified based on the WLA from the TMDL prior to the date of compliance without violating the Clean Water Act.

Ecology Response:

The State has not listed this segment on the 303d list for fecal coliform, but rather the succeeding downstream segment. The City's effluent currently meets fecal coliform water quality standards at the end of its mixing zone prior to the 303d listed waters with the technology-based limits proposed in the draft permit.

3. Total Ammonia

The State's discussion in the fact sheet indicated that there was not reasonable potential for this pollutant to violate water quality standards, yet the effluent limits from the previous permit were retained due to anti-backsliding prohibitions in Federal and State regulations. Actually, federal regulations do allow backsliding of water-quality based effluent limits as long as the less stringent limits do not violate water quality standards. EPA refers the State to the Clean Water Act section 402(o)(1) which states that effluent limits may not be less stringent than comparable effluent limits in the previous permit except in compliance with the Clean Water Act section 303(d)(4).

Recommendation: EPA understands that the State's intent was to re-evaluate the need for a water quality-based effluent after the permittee submitted the final Facility Plan. However, if the State rules are more restrictive the Act for backsliding, then the State needs to provide final effluent limitations for Total Ammonia based on water quality. The State should re-evaluate the need for a water quality-based effluent limit for this parameter prior to issuance. The State can implement the final limits through a compliance schedule and the final limits can be modified based on the final Facility Plan prior to the date of compliance without violating the Clean Water Act.

Ecology Response:

The department proposes to carry forward the limits from the previous permit, which were the interim limits in the draft permit. While EPA may not consider an increase in the limit to represent backsliding based on the water quality standard for ammonia, Ecology believes that maintaining this reduced ammonia discharge capability will be advantageous to the City in the future should the river be placed on the 303d list for nutrients.

4. Metals

The State's discussion in the fact sheet indicated that there was reasonable potential for copper, lead, silver and zinc to violate water quality standards. The State chose not to establish effluent limits for these pollutants in this permit because there does not exist, at this time, a cost-effective treatment technology to remove these metals from the discharge. The only way the State may waive the effluent limits for this permit would be to establish a variance under the Clean Water Act section 301(c) or section 302(b)(2). Since the State has not obtained a waiver, water quality-based effluent limits must be implemented in the permit.

Additionally, the State has listed this segment of the Yakima River on the 1998 303(d) list for mercury and silver. The State must implement final effluent limits that will not cause or contribute to further impairment of water quality standards. The current exceedance of water quality standards for this pollutant indicates that the receiving water body does not have the assimilative capacity to accept an additional loading of this pollutant.

Recommendation: EPA understands that the State's intent was to re-evaluate the need for a water quality-based effluents for metals after the permittee submitted the final Facility Plan. However, the State needs to provide final effluent limitations for metals based on water quality. The State should re-evaluate the need for a water quality-based effluent limit for copper, lead and zinc. The State can implement the final limits through a compliance schedule and the final limits can be modified based on the final Facility Plan prior to the date of compliance without violating the Clean Water Act.

EPA recommends that the State implement the water quality criteria for mercury and silver at the end-of-pipe. The State can implement the final limits through a compliance schedule and the final limits can be modified based on the WLA from the TMDL prior to the date of compliance without violating the Clean Water Act.

Ecology Response:

Copper, lead, silver and zinc showed reasonable potential. Concerning mercury and silver, the department's Environmental Assessment Program has completed confirmation sampling of the river and has determined the 1998 303(d) listings for these metals were made in error, based on flawed USGS sampling methods. Therefore, there is no impairment for mercury and silver and these metals are recommended for deletion from the draft 303(d) list. See *Results of Sampling to Verify 303(d) Metals Listings for Selected Washington Rivers and Creeks*, Ecology Pub. No. 02-03-039, Recommendations, p. 20.

The department is not proposing to apply the silver and mercury WQ criteria at end-of-pipe, since these pollutants will be dropped from the 303(d) list. The department proposes authorizing use of a mixing zone for these pollutants.

This permit, as issued, will contain WQ-based metals limits for copper, lead, silver and zinc. Interim, performance-based limits are established for copper and zinc, because the treatment plant has already discharged these metals at concentrations greater than the calculated WQ-based limits. Interim and final limits are as follows:

I. Interim Limitations

Beginning on the **effective date of this permit** and lasting through **January 15, 2008**, the Permittee is authorized to discharge treated municipal wastewater to the Yakima River subject to the following limitations:

EFFLUENT LIMITATIONS ^a : OUTFALL # 001		
Parameter	Average Monthly	Average Weekly
5-day Biochemical Oxygen Demand (BOD ₅)	30 mg/L 85% removal	45 mg/L
Total Suspended Solids (TSS)	30 mg/L 85% removal	45 mg/L
Fecal Coliform Bacteria	200/100 mL	400/100 mL
pH	Between 6.0 and 9.0 at all times.	
Parameter	Average Monthly	Maximum Daily ^b
Total Residual Chlorine (TRC)	0.012 mg/L	0.029 mg/L
Total Ammonia, as N	4.6 mg/L	12.3 mg/L
Total Copper	9.84 µg/L	14.36 µg/L
Total Lead	3.96 µg/L	5.77 µg/L
Total Silver	2.18 µg/L	3.17 µg/L
Total Zinc	70.35 µg/L	95.82 µg/L

Chronic WET Limit	The chronic toxicity limit shall be no statistically significant difference in test organism response between the chronic critical effluent concentration (CCEC), 15.1% of the effluent, and the control. (See Special Condition S9. for further information.)
a-The average monthly and weekly effluent limitations are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.	
b-The maximum daily effluent limitation is defined as the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. The daily discharge is the average measurement of the pollutant over the day.	

2. Final Limitations

Beginning on **January 16, 2008** and lasting through the **expiration date**, the Permittee is authorized to discharge treated municipal wastewater to the Yakima River subject to the following limitations:

EFFLUENT LIMITATIONS ^{a,b} : OUTFALL # 001		
Parameter	Average Monthly	Average Weekly
BOD ₅	30 mg/L 85% removal	45 mg/L
TSS	30 mg/L 85% removal	45 mg/L
Fecal Coliform Bacteria	200 #colonies/100 mL	400 #colonies/100 mL
pH	Between 6.0 and 9.0 at all times.	
Parameter	Average Monthly	Maximum Daily ^c
TRC	0.012 mg/L	0.029 mg/L
Total Ammonia, as N	4.6 mg/L	12.3 mg/L
Total Copper	6.71 µg/L	9.80 µg/L
Total Lead	3.96 µg/L	5.77 µg/L
Total Silver	2.18 µg/L	3.17 µg/L
Total Zinc	45.70 µg/L	66.70 µg/L
Chronic WET Limit	No statistically significant difference in test organism response between the chronic critical effluent concentration (CCEC), 15.1% of the effluent, and the control. (See Special Condition S9. for further information.)	
a-The average monthly and weekly effluent limitations are based on the arithmetic mean of the samples taken with the exception of fecal coliform, which is based on the geometric mean.		
b-Effluent limits may be revised through a permit modification after approval of the Final Facility Plan.		
c-The maximum daily effluent limitation is defined as the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. The daily discharge is the average measurement of the pollutant over the day.		

The spreadsheets used to determine the metals limits are at the end of this appendix. These limits will be tied to a Schedule of Compliance contained in a separate Special Condition, S13. This special condition will require the City to conduct a study to determine the source(s) of these metals and a course of action to reduce loadings to the treatment plant and in the plant effluent. By the end of the permit cycle, the City will be required to submit an engineering report containing a comprehensive assessment of the metals and the corrective steps the City has taken. If the City determines the metals cannot be sufficiently reduced through operational changes, then the report must also describe the steps to be taken to achieve compliance with the surface water quality standards for these metals.

5. Pesticides

The State's discussion in the fact sheet indicated that there was reasonable potential for Beta Endosulfan to violate water quality standards based on one data point. The State chose not to establish effluent limits for these pollutants in this permit because the facility is undergoing upgrade and the final Facility Plan will present an opportunity for the City to evaluate the discharge after collecting more data and applying a more sophisticated water quality model than those used by the State. However, the permit does not require the City to conduct this evaluation in the Facility Plan.

Recommendation: EPA agrees with the State that an effluent limit for this parameter may not be necessary based upon one data point. However, Section S11 of the permit should require the permittee to evaluate the discharge specifically for Beta Endosulfan based on a certain monitoring regime and State approved water quality model.

Ecology Response:

Beta Endosulfan was detected once, in September 1999. The department proposes requiring the City to monitor for this chemical twice per month during the fruit processing season. If this, or any, substance turns up at levels that can result in interference or pass-through, S6.D (Pretreatment) requires the City to update its local limits to address the problem.

Comment 2: Section S1.B

The second paragraph of the draft permit in this section states that the mixing zones and dilution factors apply until such time as a Facility Plan or Effluent Mixing Study is approved by WDOE. Therefore, once WDOE approves a Facility Plan or Effluent Mixing Zone study, the mixing zones and dilution factors in the permit no longer apply. Additionally, the fact sheet discusses the inadequacy of the current Effluent Mixing Zone study, but the permit does not require the permittee to conduct a new study.

Recommendation: The permit should require that the current mixing zones and dilution factors apply until the State modifies the permit to incorporate the approved Facility Plan

or Effluent Mixing Zone Study. Additionally, the State should either include a requirement in the permit for the permittee to conduct an Effluent Mixing Zone study or remove the reference to this study in the permit.

Ecology Response:

The department agrees that the current mixing zones and dilution factors apply until the permit is modified and to remove the reference to the study from the permit.

Comment 3: Section S2.A Effluent Wastewater

The permit does not contain a definition of “% removal” for BOD-5 or TSS.

Recommendation: Include a definition for “% removal” in the footnotes to the table.

Ecology Response:

The following footnote will be added to the BOD and TSS effluent limits in S1 A. of the permit.

The average monthly effluent concentration for BOD₅ and Total Suspended Solids shall not exceed 30 mg/L or 15 percent of the respective monthly average influent concentrations, whichever is more stringent.

Comment 4: Section S2.A TKN

The draft permit requires monitoring of the domestic influent wastewater and industrial influent wastewater for TKN, however, the fact sheet does not provide a basis for requiring this monitoring. Additionally, EPA is curious as to why the State is requiring influent monitoring of this parameter, but not effluent monitoring.

Ecology Response:

The Yakima treatment plant is designed to fully nitrify. The plant's design criteria is therefore based on oxidizable nitrogen (TKN). The facility is required to monitor this parameter to determine compliance with the facility overloading requirements of the permit. The discharge is monitored for ammonia as this is the form of oxidizable nitrogen present in the effluent.

Comment 5: Section S2.A Sulfates

The draft permit requires monitoring of the effluent wastewater for sulfites, however, the fact sheet does not provide a basis for requiring this monitoring.

Ecology Response:

Sulfite is toxic to aquatic life and the department feels it is important to quantify the amount of sulfite the City is discharging to the river.

Comment 6: Section S2 A E Coli Bacteria

The State is currently proposing to replace the criteria for Fecal Coliform bacteria with EPA's nationally recommended criteria.

Recommendation: The State should consider requiring monitoring of E. Coli to determine future compliance with the new standard.

Ecology Response:

This permit will not require monitoring for E. Coli because the new Surface Water Quality Standards have not been finalized or adopted yet. The bacteria effluent limit reflects the current standard for Fecal Coliform Bacteria and the compliance monitoring corresponds to the regulated pollutant. The Department is in the process of conducting split-sample testing at other municipal treatment plants to assess compliance with the new E. Coli standard. The Department will revisit this issue at the next permit renewal after the new Surface Water Quality Standards have been finalized and adopted.

Comment 7: Section S4.E.3 and Section S6 A.2 (and Summary of Permit Report Submittals)

Both these sections of the permit include the requirement for a submittal of January 15, 2003. Additionally, the Summary of Permit Report Submittals incorrectly refers to the Infiltration and Inflow Evaluation in Permit Section S4.D.

Ecology Response:

The permit will be revised accordingly.

Comment 8: Section S8.A

In the first paragraph, the permit states that the permittee shall conduct using the Daphnid, 48-hour static test, method EPA/600/4-90/027F. EPA/600/4-90/027F is an EPA publication rather than a method.

Recommendation: The sentence should be corrected to indicate that the permittee is to conduct the 48-hour static test for the Daphnid method prescribed in EPA publication EPA/600/4-90/027F, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*.

Ecology Response:

The permit will be revised accordingly

Comment 9: Sediment Quality

The State's discussion in the fact sheet indicates that the Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards.

Recommendation: If the State does not have adequate information to determine the potential for the discharge to cause a violation of water quality standards, then the State should require the permittee to provide the information as part of the application or as a requirement in the permit. If it is the BPJ of the permit writer that the sediment quality standards would not be violated by this discharge, then there should be a discussion supporting this decision.

Ecology Response:

As part of the Outfall Evaluation, the department will require the City to check for sediment deposition and submit photographic verification, if possible.

Comment 10:

The fact sheet did not provide the basis for requiring influent and effluent monitoring of cyanide (WAD), oil and grease, phenols, priority pollutant metals, and priority pollutant organics. In addition, the draft permit requires continual ammonia monitoring, yet the proposed effluent limit only applies to August and September. Again, the fact sheet did not provide the basis for requiring ammonia monitoring when the limit does not apply. Please provide the basis for all monitoring required by this permit.

Ecology Response:

Influent and effluent monitoring of cyanide (WAD), oil and grease, phenols, priority pollutant metals, and priority pollutant organics is required as part of the pretreatment program. The ammonia limits in the permit are in force year round. The comment regarding seasonal ammonia limits appears to be in error.

Water Quality-Based Permit Limits for acute and chronic criteria
(based on EPA/505/2-90-001 Box 5-2)
Based on Lotus File WQBP2.WK1 Revised 19-Oct-93
PROPOSED METALS LIMITS FOR CITY OF YAKIMA SIP

INPUT				
	COPPER	LEAD	SILVER	ZINC
1. Water Quality Standards (Concentration)				
Acute (one-hour) Criteria:	5.38	13.60	0.42	40.61
Chronic (n-day) Criteria:	3.28	0.40	1.00	30.56
2. Upstream Receiving Water Concentration				
Upstream Concentration for Acute Condition (7Q10):	0.54	0.05	0.01	0.80
Upstream Concentration for Chronic Condition (7Q10):	0.54	0.05	0.01	0.80
3. Dilution Factors (1/{Effluent Volume Fraction})				
Acute Receiving Water Dilution Factor at 7Q10:	1.51	1.51	1.51	1.51
Chronic Receiving Water Dilution Factor at 7Q10:	6.61	6.61	6.61	6.61
4. Coefficient of Variation for Effluent Concentration (use 0.6 if data are not available):	0.60	0.60	0.60	0.60
5. Number of days (n1) for chronic average (usually four or seven; four is recommended):	4	4	4	4
6. Number of samples (n2) per month for monitoring:	1	1	1	1
OUTPUT				
1. Z Statistics				
LTA Derivation (99%tile):	2.326	2.326	2.326	2.326
Daily Maximum Permit Limit (99%tile):	2.326	2.326	2.326	2.326
Monthly Average Permit Limit (95%tile):	1.645	1.645	1.645	1.645
2. Calculated Waste Load Allocations (WLA's)				
Acute (one-hour) WLA:	7.848	20.511	0.629	60.913
Chronic (n1-day) WLA:	18.651	2.364	6.554	197.514
3. Derivation of LIAs using April 1990 TSD (Box 5-2 Step 2 & 3)				
Sigma ² :	0.3075	0.3075	0.3075	0.3075
Sigma ² -n1:	0.0862	0.0862	0.0862	0.0862
LIA for Acute (1-hour) WLA:	2.520	6.586	0.202	19.558
LIA for Chronic (n1-day) WLA:	9.837	1.247	3.457	104.175
Most Limiting LIA (minimum of acute and chronic):	2.520	1.247	0.202	19.558
4. Derivation of Permit Limits From Limiting LIA (Box 5-2 Step 4)				
Sigma ² -n2:	0.3075	0.3075	0.3075	0.3075
Daily Maximum Permit Limit (Dissolved):	7.848	3.882	0.629	60.913
Monthly Average Permit Limit (Dissolved):	5.380	2.661	0.431	41.755
5. Translated Permit Limit				
Effluent Translator	0.800	0.661	0.198	0.913
Daily Maximum Permit Limit (Total Recoverable):	9.80	5.77	3.17	66.70
Monthly Average Permit Limit (Total Recoverable):	6.71	3.96	2.18	45.70

YAKIMA STP PERFORMANCE-BASED EFFLUENT LIMITS FOR COPPER
 USE EXCEL TO PERFORM THE LOGNORMAL TRANSFORMATION
 AND CALCULATE THE TRANSFORMED MEAN AND VARIANCE

LOGNORMAL TRANSFORMED MEAN = 2.0322
 LOGNORMAL TRANSFORMED VARIANCE = 0.0738
 NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING = 4
 AUTOCORRELATION FACTOR(ne)(USE 0 IF UNKNOWN) = 0
 E(X) = 7.9178
 V(X) = 4.802
 VARn 0.0190
 MEANn= 2.0596
 VAR(Xn)= 1.201

MAXIMUM DAILY EFFLUENT LIMIT = 14.356
 AVERAGE MONTHLY EFFLUENT LIMIT = 9.837



Total Copper, in µg/L	logn
7.496	2.01437
11.983	2.483489
8.211	2.105475
7.784	2.05207
7.67	2.037317
4.89	1.587192
5.81	1.759581
9.19	2.218116
MEAN	2.032201
STDEV	0.271685
VARIANCE	0.073813

YAKIMA STP PERFORMANCE-BASED EFFLUENT LIMITS FOR ZINC
 USE EXCEL TO PERFORM THE LOGNORMAL TRANSFORMATION
 AND CALCULATE THE TRANSFORMED MEAN AND VARIANCE

LOGNORMAL TRANSFORMED MEAN = 4.0545
 LOGNORMAL TRANSFORMED VARIANCE = 0.0477
 NUMBER OF SAMPLES/MONTH FOR COMPLIANCE MONITORING = 4
 AUTOCORRELATION FACTOR(ne)(USE 0 IF UNKNOWN) = 0
 E(X) = 59.0468
 V(X) = 170.337
 VARn = 0.0121
 MEANn = 4.0723
 VAR(Xn) = 42.584

MAXIMUM DAILY EFFLUENT LIMIT = 95.821
 AVERAGE MONTHLY EFFLUENT LIMIT = 70.352

Total Zinc, in µg/L	logn
48.533	3.882244
59.867	4.092125
70.648	4.25771
89.037	4.489052
50.3	3.918005
50.1	3.914021
48.2	3.875359
55	4.007333

MEAN 4.054481

STDEV 0.218403

VARIANCE 0.0477

Comments received from the City of Yakima

The following comments were received from the City in a letter dated January 23, 2003.

Permit Comments

Acute and Chronic Toxicity (Special Conditions S8 and S9)

The City understands the Department is working to clarify the requirements of these two sections to ensure they reflect the proper procedures for sampling events, frequency, testing, compliance monitoring, and to account for the transient nature of discharges and the seasonality of industrial activities.

Fact Sheet Comments

Description of Facility (page 7)

First paragraph, second sentence, please revise from the "Town of Union Gap" to the "City of Union Gap".

Fecal Coliform (Page 17)

First paragraph, second sentence, please revise from "monthly average" to "geometric mean" to reflect the correct standard.

Ecology Response

The above observations are valid comments; however, regulations prohibit revision of the fact sheet after facility review.

Temperature (Page 30)

The Department acknowledges that the City's discharge complies with the temperature criteria stated in WAC 173-201A-130(141). Consequently, there is no violation of the state antidegradation policy. Therefore, the second paragraph on page 30 should be deleted.

Ecology Response

The Department acknowledges that analysis of the City's discharge did not violate the temperature criteria of 21°C. However, analysis of the City's discharge did result in a finding that the temperature at the edge of the chronic mixing zone was raised by 0.6°C above background. In any case, regulations prohibit revision of the fact sheet after facility review.

pH (page 31)

Second paragraph, last sentence should read: "Therefore, the technology-based effluent limitations for pH were placed in the permit"

Ammonia (page 32)

Second paragraph: Ninetieth percentile should be numeric (90th percentile); please revise the two incidences of this use.

Ecology Response:

The previous two observations are valid comments; however, regulations prohibit revision of the fact sheet after facility review.

Metals (pages 33-34)

Page 34, first full paragraph. We suggest that the Department add the following statement to the beginning of this paragraph: "The metals concentrations present in the City's effluent are comparable with metals concentrations of similarly-sized cities with a significant industrial presence". In addition, we suggest that the Department add the following sentence to the end of this paragraph: "Finally, the City may update its mixing zone study as part of its Facility Plan, which will provide additional information to determine whether certain metals in the City's discharge have a reasonable potential to exceed the water quality standards".

Ecology Response:

The City's suggested additions to the fact sheet are valid observations; however, regulations prohibit revision of the fact sheet after facility review.

